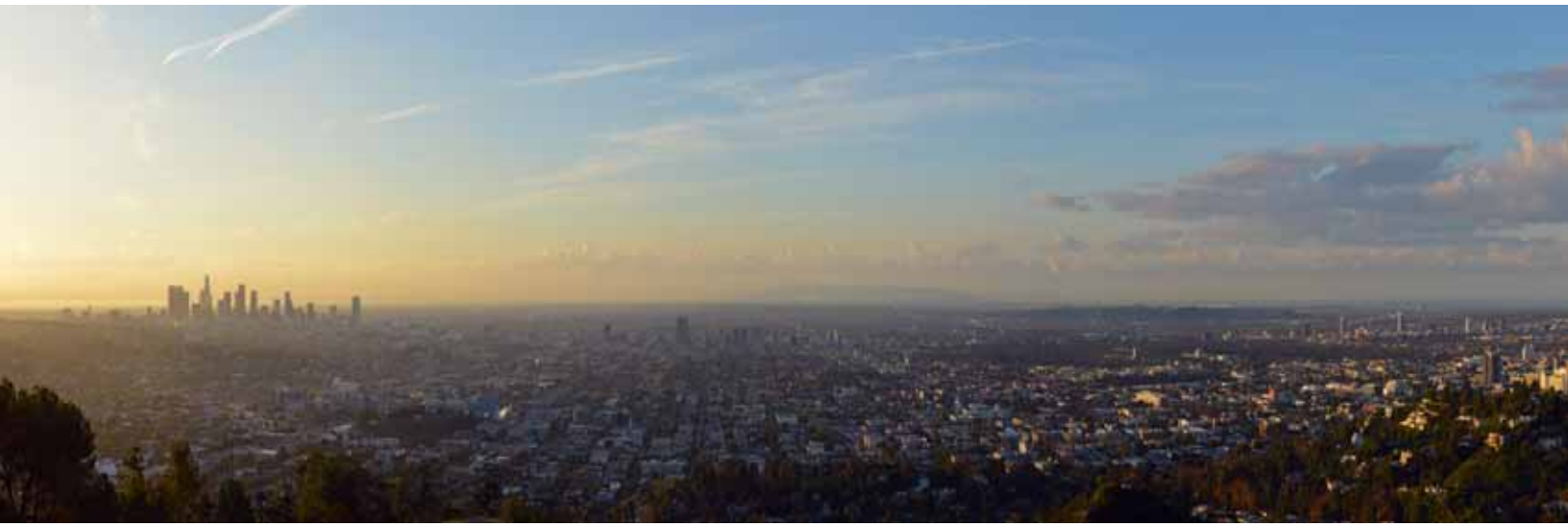
City of Los Angeles

Zero Waste Progress Report

March 2013

CITY OF LOS ANGELES
SANITATION
DEPARTMENT OF
PUBLIC WORKS
Protecting Public Health and the Environment

Commissioned by
City of Los Angeles
Bureau of Sanitation



This independent report was commissioned by the Bureau of Sanitation and completed as a year-long student project of the UCLA Engineering Extension Recycling and Municipal Solid Waste Management Certification Program and does not represent the opinions of the City or the University of California. With heartfelt appreciation and thanks for this wonderful collaborative opportunity to be of service to government, the Project Team wishes the staff and leadership of the Bureau of Sanitation every success in achieving the zero waste goal.

FOREWORD

THE BUREAU OF SANITATION IS PLEASED TO PRESENT to the Mayor of Los Angeles the following report commissioned by the Bureau of Sanitation (Sanitation) and prepared by the faculty and students of the UCLA Engineering Extension's Recycling and Municipal Solid Waste Management Program. Sanitation requested a review and an independent assessment of the City's progress towards its "Zero Waste-to-Landfill" goal and recommendations for the City's programmatic and policy approach to achieve zero waste to landfill by 2025 to enhance the Solid Waste Integrated Resources Planning process.

The City achieved a remarkable landfill diversion rate of 76.4% by the year 2012 based upon the calculation methodology adopted by the State of California. The progress that the City has made is the result of programs and policies that are part of the integrated waste management approach initiated over 25 years ago. The City has long recognized that waste management is a fundamental component of the City's overall environmental sustainability and climate change efforts and an integral part of the effort to reduce greenhouse gases.

The City is committed to continually improving and implementing a comprehensive suite of integrated waste management programs to achieve the zero waste-to-landfill goal by 2025.

This report provides a brief overview of the City's influential programs and showcases several examples of exemplary benchmarking efforts by businesses and institutions that have been working in partnership with the City of Los Angeles. Sanitation can provide additional information on its programs and policies to any interested parties.

Please contact Ms. Karen Coca, Solid Resources Citywide Recycling Division Manager, at 213-485-3905 or Karen.Coca@lacity.org.

The City of Los Angeles wishes a prosperous future in which all residents and businesses participate in creating a healthy community through environmentally sustainable practices.

CITY OF LOS ANGELES

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and the Environment

ACKNOWLEDGEMENTS

The "Project Team" of students, faculty, and Advisory Board Members of the UCLA Engineering Extension's Recycling and Municipal Solid Waste Management Program wish to thank the City of Los Angeles for the opportunity to participate in reviewing the City's waste reduction and recycling efforts and provide recommendations to achieve zero waste by the year 2025. The UCLA Engineering Extension also would like to acknowledge the effort by the members of its Advisory Board to provide the technical review on this project and to create the best possible learning experience for students.

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THE CITY OF LOS ANGELES

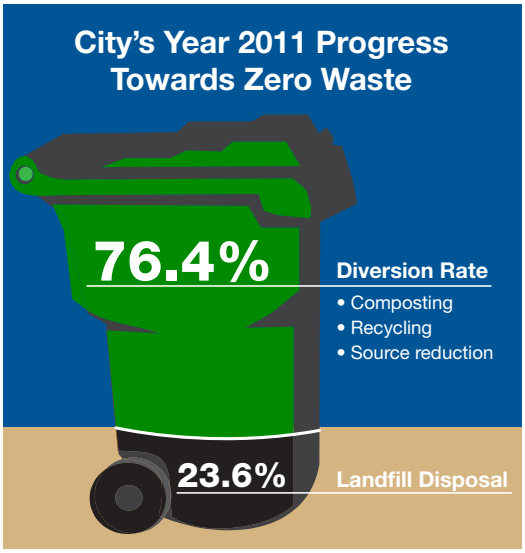
Zero Waste Progress Report

Section 1

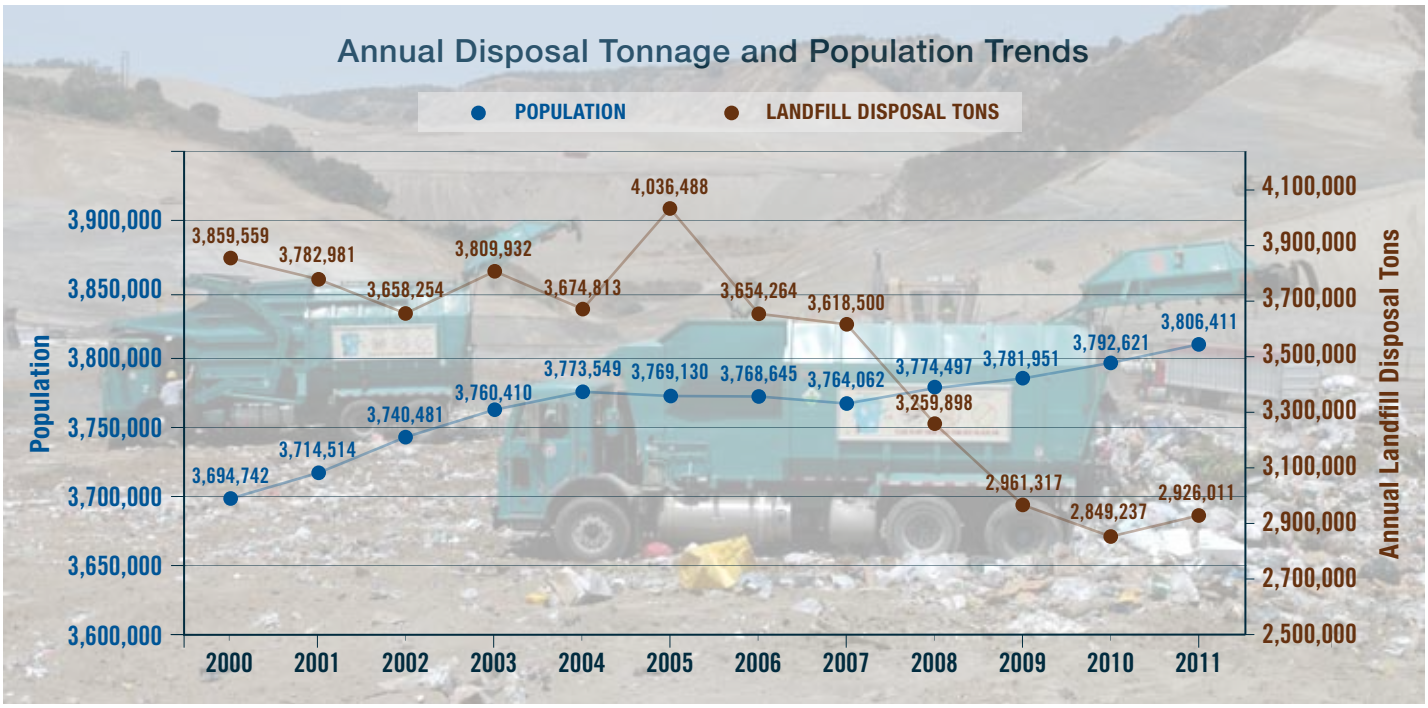
WASTE POLICY IN CALIFORNIA HAS BEEN LANDFILL-CENTRIC for many years. Growing concerns about the environment and conservation, however, have led to seeking policies that divert some, and eventually all, waste away from landfills. The State of California's Integrated Waste Management Act of 1989 mandated that each city achieve a 25% diversion rate of waste from landfill by the year 1995 and a 50% diversion rate by the year 2000. Waste can be diverted from a landfill through waste reduction, recycling, composting, and other technologies that beneficially use the materials found in solid waste.

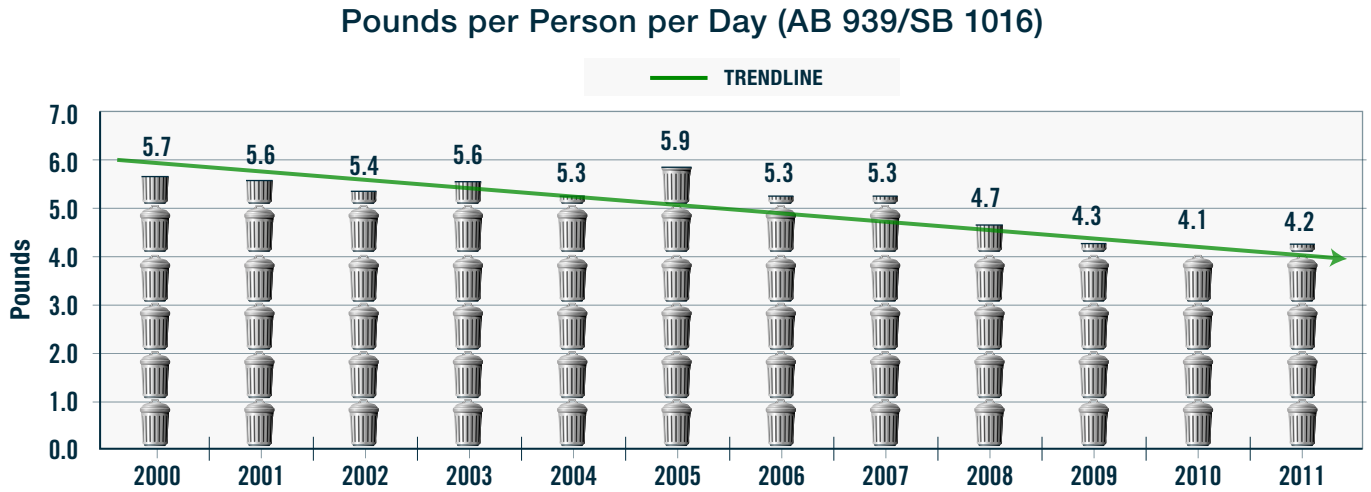
The environmental metric used to evaluate the City's progress towards its zero waste goal is called the "diversion rate," or the percentage of generated waste that is not disposed in a landfill. In 2001, the City of Los Angeles (City) adopted a 70% diversion rate goal by the year 2020. During his term of office, Mayor Antonio Villaraigosa revised the diversion rate goal to 75% by 2013, and the City adopted a new goal of "Zero Waste" by the year 2025.

The City had a diversion rate of 20.6% in 1990, 46.0% by 1995, and 65.2% by 2000. By the end of 2011, the City achieved a diversion rate of 76.4%.



The progress made by the City reflects the extensive participation of its residents and businesses in waste reduction and recycling programs and demonstrates the City's comprehensive infrastructure that has been developed and implemented during the past 25 years. Most significantly, the overall tons disposed in landfills during the last 12 years have decreased while the population has steadily increased.





Even with this accomplishment, there are still opportunities to achieve significant additional landfill diversion, and the City is committed to achieving zero waste by the year 2025.

California Waste Disposal Sites Used by the City of Los Angeles in 2011

Destination Facility Name	Total Tons	Destination Facility Name	Total Tons
A. Sunshine Canyon City/County Landfill	1,489,114.73	N. Antelope Valley Public Landfill I	9,056.58
B. Chiquita Canyon Sanitary Landfill	730,876.96	O. Prima Deshecha Sanitary Landfill	7,882.58
C. Simi Valley Landfill & Recycling Center	359,132.46	P. Antelope Valley Public Landfill I and II	3,631.79
D. Azuza Land Reclamation Co. Landfill	323,590.65	Q. Scholl Canyon Sanitary Landfill	3,064.23
E. El Sobrante Landfill	231,978.30	R. CWMI, KHF (MSW Landfill B-19)	2,744.96
F. Lancaster Landfill &Recycling Center	168,075.07	S. Kettleman Hills - B18 Nonhaz Codisposal	1,508.80
G. Calabasas Sanitary Landfill	156,868.65	T. McKittrick Waste Treatment Site	748.58
H. Olinda Alpha Sanitary Landfill	98,876.58	U. Bakersfield Metropolitan (Bena) SLF	77.90
I. Puente Hills Landfill	97,045.05	V. Altamont Landfill & Resource Recovery	45.54
J. Avenal Regional Landfill	42,912.12	W. Mid-Valley Sanitary Landfill	39.97
K. Commerce Refuse-To-Energy Facility	35,349.50	X. Otay Landfill	26.75
L. Southeast Resource Recovery Facility	31,628.28	Y. San Timoteo Sanitary Landfill	5.57
M. Toland Road Landfill	24,654.00	Z. Guadalupe Sanitary Landfill	0.50

Section 2

SUMMARY OF MAJOR PROGRAMS

Waste Reduction & Recycling

THE CITY OF LOS ANGELES HAS A POPULATION OF APPROXIMATELY 3.8 million living in approximately 694,000 single family homes and 649,000 multi-family dwellings. The City of Los Angeles, Department of Public Works, Bureau of Sanitation's (Sanitation) residential curbside program serves 662,000 single-family dwellings (including duplexes) and 83,000 multi-unit buildings with refuse, recycling, and bulky item pickups. The City also provides a multi-family recycling program serving approximately 420,000 of the estimated 579,000 multi-family dwellings (buildings with five or more units) with trash collected by permitted private waste haulers, with recycling and with bulky item pick-up programs. Sanitation currently operates a solid waste collection fleet of 707 vehicles, of which 558 are alternative fueled vehicles.

The City has more than 150,000 waste generating commercial and industrial businesses, governmental, and educational entities. Some individual entities (e.g., Los Angeles Unified School District) dispose almost 50,000 tons per year of solid waste. In 1990, residents and businesses in Los Angeles disposed of approximately 3,800,000 tons of waste. To put the tonnage in perspective, 70% of cities in California disposed less than 50,000 tons per year in 1990.

Sanitation is responsible for planning and implementing programs to achieve the 2025 zero waste-to-landfill goal. The City has established new policies and plans and instituted new source reduction, recycling, and composting programs to enhance the existing recycling infrastructure.

ZERO WASTE

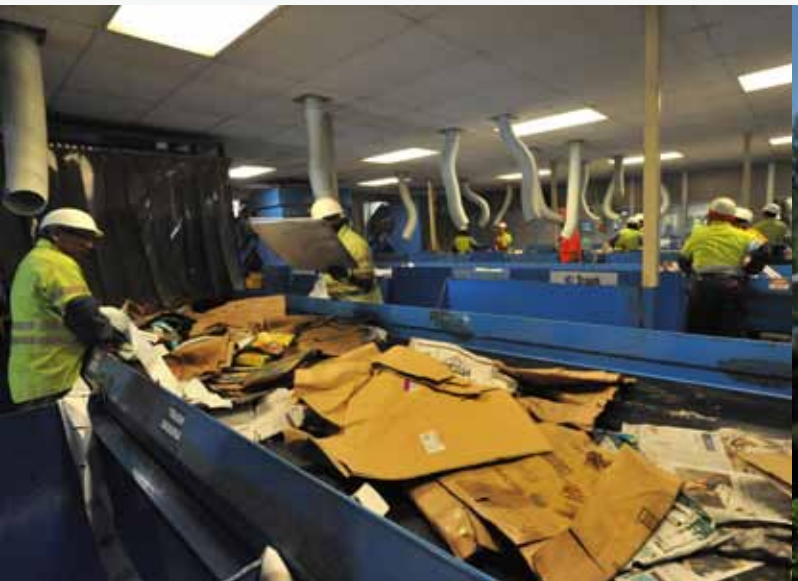
IN 2006, THE RENEW LA (RECOVERING ENERGY, NATURAL RESOURCES, AND ECONOMIC BENEFITS FROM WASTE FOR LOS ANGELES) policy was passed unanimously by the City Council as the resource management blueprint to guide the City for the next 25 years. The plan emphasized economics, environmentalism, conservation, and technological innovation. In addition to expanding the existing source reduction, recycling, and composting efforts, and implementing new programs, the RENEW LA plan calls for developing seven conversion technology facilities, with one facility located in each of the Sanitation's six wastesheds, and the seventh conversion technology facility to be located within the local region. The City Council codified RENEW LA Plan's Zero Waste Goal, stating:

"The goal of Zero Waste as defined in this plan is to reduce, reuse, recycle, or convert to energy the resource now going to disposal so as to achieve an overall diversion level of 90% or more by 2025; and to leave for disposal only a small inert residual."

The long-term project is designed to lead Los Angeles out of the use of landfills and to recover/convert materials (i.e., post recycled residual materials) traditionally disposed at landfills for beneficial use in the form of green electricity, alternative fuel sources, and manufacturing feedstock(s).

In addition to maintaining waste collection services, Sanitation plans and implements programs to achieve the 2025 zero waste goal. Since 2006, Sanitation has implemented numerous programs that have contributed to the current 76.4% diversion rate from landfill. These programs include:

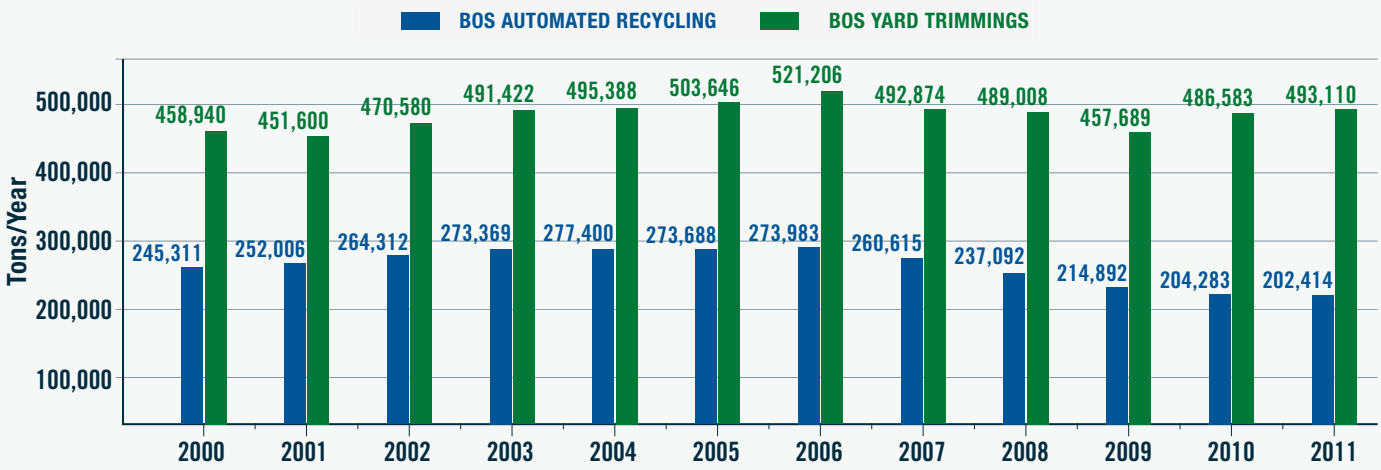
- Making the City's Public Works Building the first zero-waste city facility in July 2010
- Establishing a fund from Sunshine Canyon Landfill host fees for developing facilities that reduce landfilling and mandating a reduction of City-collected solid waste going to Sunshine Canyon Landfill
- Establishing a Green Energy Producer Bonus and reducing City taxes based on a company's recycling performance
- Adding film plastic, polystyrene, and carton recycling to the Sanitation-collected residential blue recycling bin
- Adding residential food waste to the Sanitation-collected residential green waste recycling bin (pilot program at 8,700 homes)
- Expanding recycling to 430,000 multi-family households, 75% of all multi-family units and now available to all multi-family unit (the largest multi-family program in the nation)
- Implementing recycling in the commercial sector through the Business Waste Assessment (BWA) Program; developing a Green Business Certification Program for hotels (Green Lodging Program); restaurants, office/retail, auto repair (Green Business Program); and cultural facilities (Green Arts Program)
- Implementing food waste recycling at 1,200 participating restaurants (diverting over 43,000 tons per year of compostable food and paper)
- Passing a mandatory City-wide construction and demolition waste recycling ordinance in December 2010
- Expanding Los Angeles Unified School District blue bin recycling and recycling education to 638 schools (90% of elementary schools)
- Supporting LA SHARES, a non-profit organization that redirects donations of office supplies, equipment, and personal care products from businesses to local non-profits and schools
- Initiating the franchising of waste haulers servicing commercial properties by providing legal notice (5-Year Notification Letter to Permitted Private Waste Haulers)
- Adopting and implementing the Environmentally Preferred Purchasing Policy to use the City's buying power to develop greener products



The people of Los Angeles are diverse, with 224 identified languages and more than 18% of the population not speaking English. Communication efforts to reach such a diverse population have been, and continue to be, challenging, although the City strives to provide outreach and Call Center support in several languages. The City also has more than 18% of households with incomes below the poverty level and a median household income of $36,687 per year. This is important because any changes to existing waste reduction and recycling programs, or implementation of new programs, that increase costs to households will have a larger burden on lower income households. The City has always been extremely aware of this issue, and program costs that directly impact low-income households are a continuing constraint.

Except for the mandatory construction and demolition waste recycling program, all other waste diversion programs are voluntary. The Project Team recognizes that achieving 76% diversion rate is a remarkable achievement given the context in which the City has to operate. In addition to the sheer number of residents, currently approaching four million, the City is unique in terms of the socio-demographic factors, and faces unique challenges in planning, designing, implementing, and operating waste reduction and recycling programs designed to achieve a zero waste.

Bureau of Sanitation (BOS) Residential (Single Family Dwelling) Source Separated Curbside Recycling Program for Year 2001 – 2011 (Tons/Year)

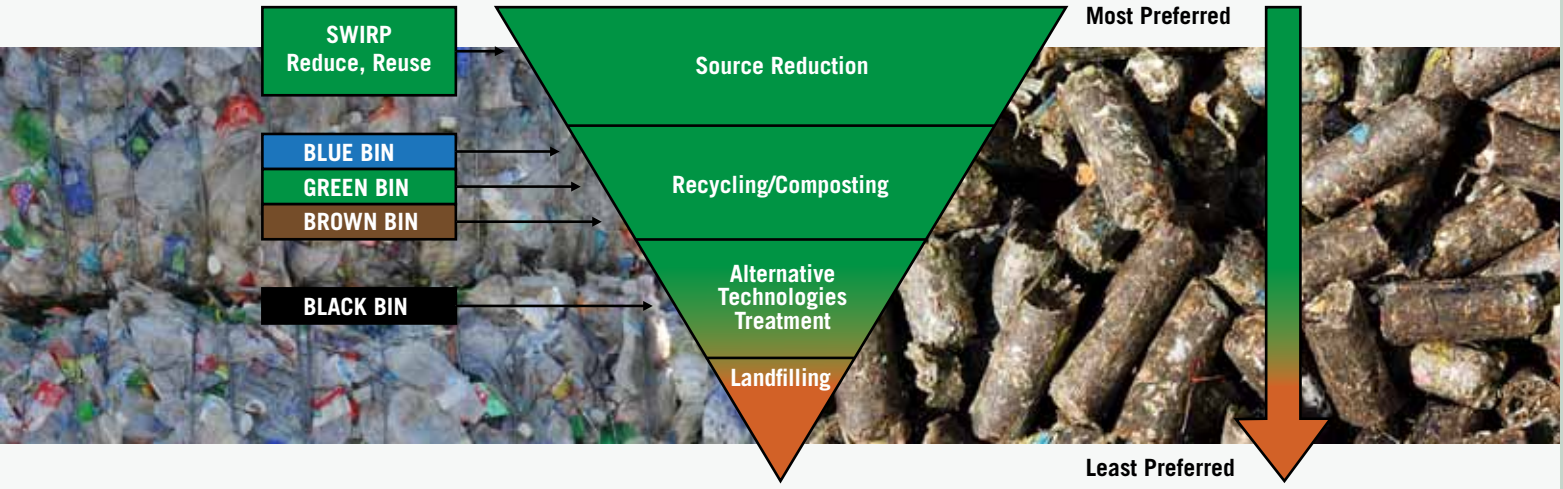


Amount of Waste Recycled (Tons) Through Bureau of Sanitation Waste Reduction and Recycling Programs

Program Types	2006	2007	2008	2009	2010	2011
Bureau of Street Services - Inerts/C&D Recycling Program	–	378,993	378,993	336,194	328,571	479,980
Mandatory C&D Recycling Ordinance	–	247,869	248,434	237,702	210,515	–
Restaurant Food Waste (Pilot)	–	11,623	15,492	28,140	32,821	43,303
LAX - C & D Recycling	11,022	10,248	4,415	8,329	4,802	2,529
Los Angeles Unified School District	3,170	7,235	12,159	17,130	21,246	21,246
Other Special Recycling Programs: Christmas Tree, Manure, L.A.SHARES, and Tires	–	–	4,415	8,104	19,510	29,429
Multifamily Recycling Pilot Program	–	1,846	9,016	13,241	14,366	14,559
Grasscycling - LAWA (Airport)	–	–	1,094	341	341	229
Sanitation Special Materials Program - White Goods and Dead Animal	–	–	559	642	658	566
Green Waste Recycling - POLA	–	117	103	198	445	594
Green Waste Recycling - DWP	–	250	250	250	108	105
Residential Food Waste (Pilot)	–	–	20	66	42	57

RENEW LA focuses on alternatives to landfill. Using the post-recycled residuals, currently disposed in landfills, "alternative technologies" are designed to extract beneficial use of materials so that landfilling is minimized. Sanitation considers "Alternative Technologies" (Alt Tech) the alternative municipal solid waste processing technologies that will increase landfill diversion in an environmentally sound manner, while emphasizing options that are energy efficient, socially acceptable, and economical.

Alt Tech includes advanced thermal recycling (ATR), pyrolysis/gasification, anaerobic digestion, composting, autoclaving, fermentation, etc. These technologies are capable of converting post-recycled residual municipal solid waste (MSW, also known as black bin materials) into useful products and chemicals, green fuels, and clean, renewable energy. This hierarchal approach accounts for the impacts of waste management options within a greater context of environmental sustainability and climate change. These technologies will keep black bin materials from landfill disposal, other than a small quantity of inert residual from the treatment processes. ATR is commonly applied in Europe and has been used to produce energy from MSW. This technology is supported by European environmental groups as it provides better means to handle the non-recyclable waste than landfilling.



PUBLIC-PRIVATE PARTNERSHIPS AND PEER MATCH MODELS IN THE CITY OF LOS ANGELES

TO PROMOTE ENVIRONMENTALLY SUSTAINABLE practices at businesses in Los Angeles, the City created the Los Angeles Green Business Certification Program. This program will recognize and promote businesses in various sectors that operate in an environmentally responsible and sustainable manner. The program is divided into three (3) parts: Green Lodging, Green Arts, and Green Business. Sanitation, Los Angeles Tourism and Convention Board, and Green Seal partnered to form the Green Lodging Program to certify green hotels. It was launched in November 2009; currently seven hotels are certified, including the Westin Bonaventure Hotel, which is the largest hotel in the City. Sanitation is working on executing a contract with the Los Angeles Community College District to administer the Green Business Program and certify businesses in the restaurant, auto repair shops, and office/retail sectors. The program is projected to launch in early 2013. The Green Arts Program is a joint endeavor of Sanitation, Department of Cultural Affairs and Arts: Earth Partnership to certify cultural facilities in the City. A Memorandum of Agreement has been drafted and is going through the City approval process. The projected launch date for the Green Arts Program is early 2013.

The Green Business Certification Program provides consumers with information on "green" businesses that consumers can use for purchasing goods and services. Certified businesses receive a "Los Angeles Green Business" decal to post on their front door or window, an electronic version of the logo to use in their promotional materials, a green resource guide, and inclusion in the list of businesses at the City's Los Angeles Green Business Program website. Thus, businesses are incentivized to consider implementing environmentally friendly policies such as resource conservation and recycling, pollution prevention, and environmentally preferable purchasing, which reduce their impact on the environment.

Sanitation also maintains a Business Waste Assessment program that shows tremendous promise for leveraging long-term impact on creating "green" businesses. Through this program, Sanitation provides on-site business waste reduction and recycling technical assistance to new and existing businesses to start up and/or optimize their recycling programs. Sanitation partners with the leaders in various industries to encourage companies to accept a leadership role as a "peer match model." A peer match model is a company that serves as role model reference benchmark for their industry in developing waste reduction, recycling programs, and environmental metrics and agrees to mentor other businesses and share their experiences.

A significant aspect of Sanitation Business Waste Assessment program's technical assistance approach is the increased effort on developing waste reduction programs and reducing greenhouse gas emissions.

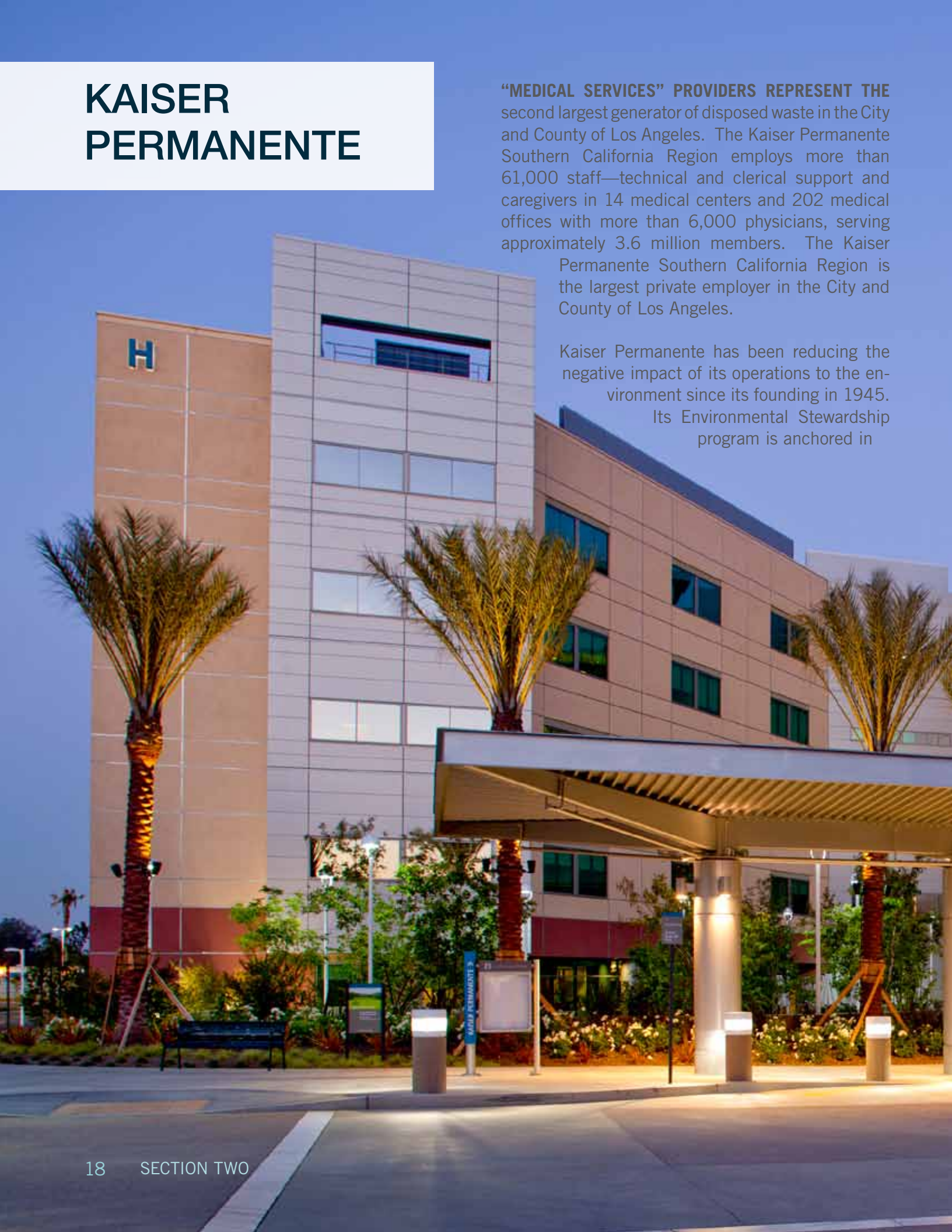
Eventually, the business technical assistance program will be expanded to include information as well as referrals for assistance on other aspects of environmental sustainability like energy and water conservation and environmentally preferred purchasing.

Through these peer match model partnerships, the City can leverage its limited resources and use the expertise within each industry within a cooperative environmental management framework that is promoted by the U.S. Environmental Protection Agency. The following sections highlight a few outstanding examples of existing public-private partnerships and describe the potential leveraging the Sanitation Business Waste Assessment Program can achieve.

KAISER PERMANENTE

"MEDICAL SERVICES" PROVIDERS REPRESENT THE second largest generator of disposed waste in the City and County of Los Angeles. The Kaiser Permanente Southern California Region employs more than 61,000 staff—technical and clerical support and caregivers in 14 medical centers and 202 medical offices with more than 6,000 physicians, serving approximately 3.6 million members. The Kaiser Permanente Southern California Region is the largest private employer in the City and County of Los Angeles.

Kaiser Permanente has been reducing the negative impact of its operations to the environment since its founding in 1945. Its Environmental Stewardship program is anchored in



promoting the health of communities; they see it as their mission to promote "total health," which emphasizes the clinical, behavioral, communal, and environmental aspects that shape one's well-being. As part of Kaiser Permanente's overall sustainability efforts, Kaiser Permanente has developed a national policy of "reducing, reusing, and recycling to eliminate waste."

From 2009 to 2010, Sanitation conducted a characterization study for medical services that used new waste characterization protocols designed specifically for zero waste planning, emphasizing source reduction options.

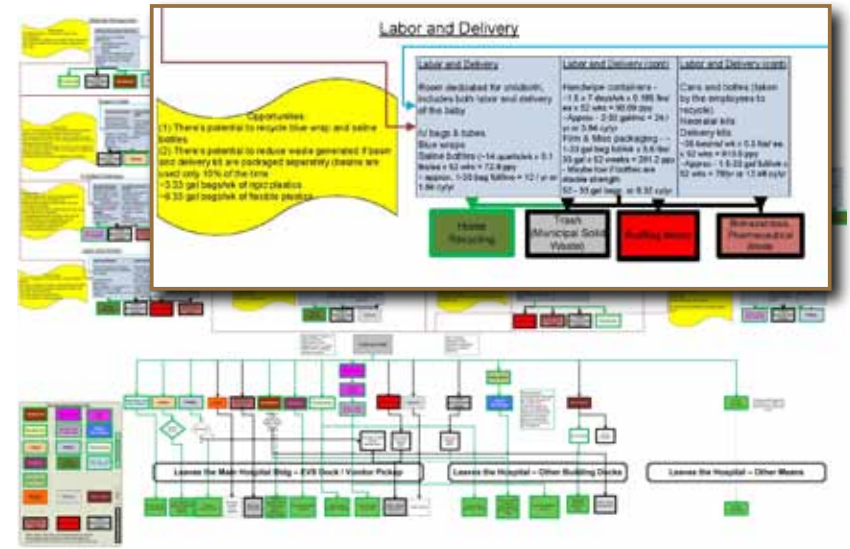
Kaiser Permanente used the City's new Waste Characterization Data to help alternative programs for reducing and recycling their waste stream. As a result, Kaiser Permanente pioneered many innovative recycling programs for the medical services industry. The "sterile bluewrap" recycling program in cooperation with Goodwill Industries has shredded/recycled over 23,000,000 pounds of paper and recycled over 58,000 pounds of bluewrap and saline bottles. Goodwill Industries has expanded this program to other non-Kaiser Permanente medical facilities, using Kaiser Permanente as an exemplary industry leader. The environmental partnership between Kaiser Permanente and Goodwill Industries has led to creating and supporting more than 100 jobs for persons with disabilities.

Kaiser Permanente has been minimizing its environmental impact and improving the health of the communities it serves by using safer chemicals, building greener hospitals, reducing/recycling wastes, and using less energy. Kaiser Permanente also is taking the initiative to "green" the health care industry by leveraging its purchasing power. Kaiser Permanente teamed up with UCLA and the Healthcare Plastic Recycling Council (HPRC) to identify potential plastic waste reduction and recycling programs. By using detailed "waste process mapping" at the Kaiser Permanente Los Angeles Medical Center, they identified opportunities for reducing plastic packaging and increasing plastic recycling, working with suppliers to do so.

Kaiser Permanente's Panorama City Medical Center is scheduled to become the first zero waste-to-landfill Kaiser Permanente facility by the end of year 2012. The Panorama City Medical Center's Green Team has implemented an extensive array of waste reduction, reuse, and recycling programs, and recently added food waste composting; but the most important step will be to send all non-recyclables to a waste-to-energy facility. By choosing a waste-to-energy conversion, the Panorama City Medical Center cuts traditional landfill disposal out of the picture, as their waste will be converted to clean energy, with only a small fraction of inert waste remaining for landfill disposal.

Kaiser Permanente Southern California Regional Waste Profile (2011)

Description	Tons
Solid Waste (Disposed)	27,484
Recycling	12,655
Cardboard	1,009
Sterile blue wrap	24
Cans & bottles	2.3
Saline bottles	5
Documents/paper	11,614
Reusables / Repurposing	256
Compostables	0.33
DIVERSION RATE	**32%**



BONAVENTURE HOTEL

THE CITY OF LOS ANGELES CREATED THE GREEN BUSINESS CERTIFICATION Program to promote environmental sustainable practices at businesses within the city. The Green Lodging Program is part of the Green Business Certification Program whose focus is on hotels, motels, and inns in the hospitality industry. This program became the first active program in the Green Business Certification Program because of demand from local hotels for an independent third-party certification program.

To pioneer reform in the hospitality industry, the City formed a partnership between Green Seal, Inc. and the Los Angeles Tourism and Convention Board (LATCB). Green Seal, Inc. is an independent non-profit organization that maintains the most rigorous, quantifiable, scientific standards for sustainability practices for organizations. Through the partnership, the Westin Bonaventure Hotel, the largest hotel in the City became the first LA City hotel to achieve a Green Seal Silver certification in 2009.

Bonaventure Hotel
Waste Generation Profile (2010)

Description	Tons
Landfill Disposal	**902**
Diversion Tons	**486**
Paper Reduction	14
Paperless Invoicing	6
Guestroom Amenities Reduction	3
Foodwaste Composting	47
CRV Recycling	39
Cardboard Recycling	128
C & D Recycling	250
Total Generation	**1,388**
DIVERSION RATE	**35%**

To meet the Green Seal standards, the Bonaventure created a "Green Team" to implement recycling, waste reduction, and energy conservation programs throughout all departments. Throughout the hotel, the Green Team color-coded bins for paper, cans, bottles, and food waste. Disposal of cardboard, batteries, and kitchen grease was turned over to recyclers, and, most importantly, all the recyclables and wastes are now tracked in a monthly report that measures progress and accountability. Other efforts include:

- Providing reusable plates, cups, and flatware in employee dining areas
- Switching to green detergents and other cleaning products
- Filling washing machines and dishwashers to full capacity before operating
- Purchasing products from vendors that use minimal packaging
- Returning wood pallets for reuse
- Updating lighting to energy-saving bulbs and installing sensors to automatically dim lights
- Installing water-saving faucets, showers, and toilets

Because the Bonaventure purchases more products than 5,000 families in a year, it can influence vendors to push for less packaging and more environmentally friendly products. With these efforts, the Westin Bonaventure Hotel has made great progress on reducing its carbon footprint and has positively impacted the community and industry, while saving more than $225,000 per year from implementing recycling and other sustainability programs.

GATEWAY TO LA

SINCE THE 2009 CITY'S GREEN Lodging Program launch with the Bonaventure Hotel as the first green certified hotel, six additional hotels in Los Angeles have been certified, with more applications pending. The Gateway to Los Angeles Business Improvement District (BID) has taken the leadership role in greening hotels in the Los Angeles International Airport (LAX) corridor.

The Gateway to LA is a property business improvement district near the LAX, boasting the City's largest consortium of Green Seal certified hotels, namely: Radisson LAX, Hilton LAX, Sheraton Gateway Hotel, Westin Los Angeles Airport Hotel, and Crowne Plaza LAX. Cumulatively, these hotels have nearly 5,100 guestrooms and represent the majority of citywide hotels who participate in the Los Angeles Green Lodging Program.

Gateway is quickly earning a reputation as a "Green Zone." Sanitation partnered with the Gateway to provide business waste assessments to businesses in the district. Together they identified the types and quantities of recyclable materials, drafted recycling hauler agreements, and selected vendors who specialize in selling environmentally preferred recycling products. Each month, Gateway members recycle over 10 tons of paper, cardboard, bottles and other recyclable materials. Gateway holds regular e-waste roundups where area businesses can safely dispose of computers and other electronic wastes.

Members of Gateway to L.A. are working with the City to increase their recycling and to forge a new, greener image for the area's hotels, office buildings, and airport-related businesses. By working together, Gateway members are leading the industry by increasing the volume of recycling in local businesses through promotional programs, converting waste into revenues, and enhancing their image by being recognized as an environmentally friendly place to do business.

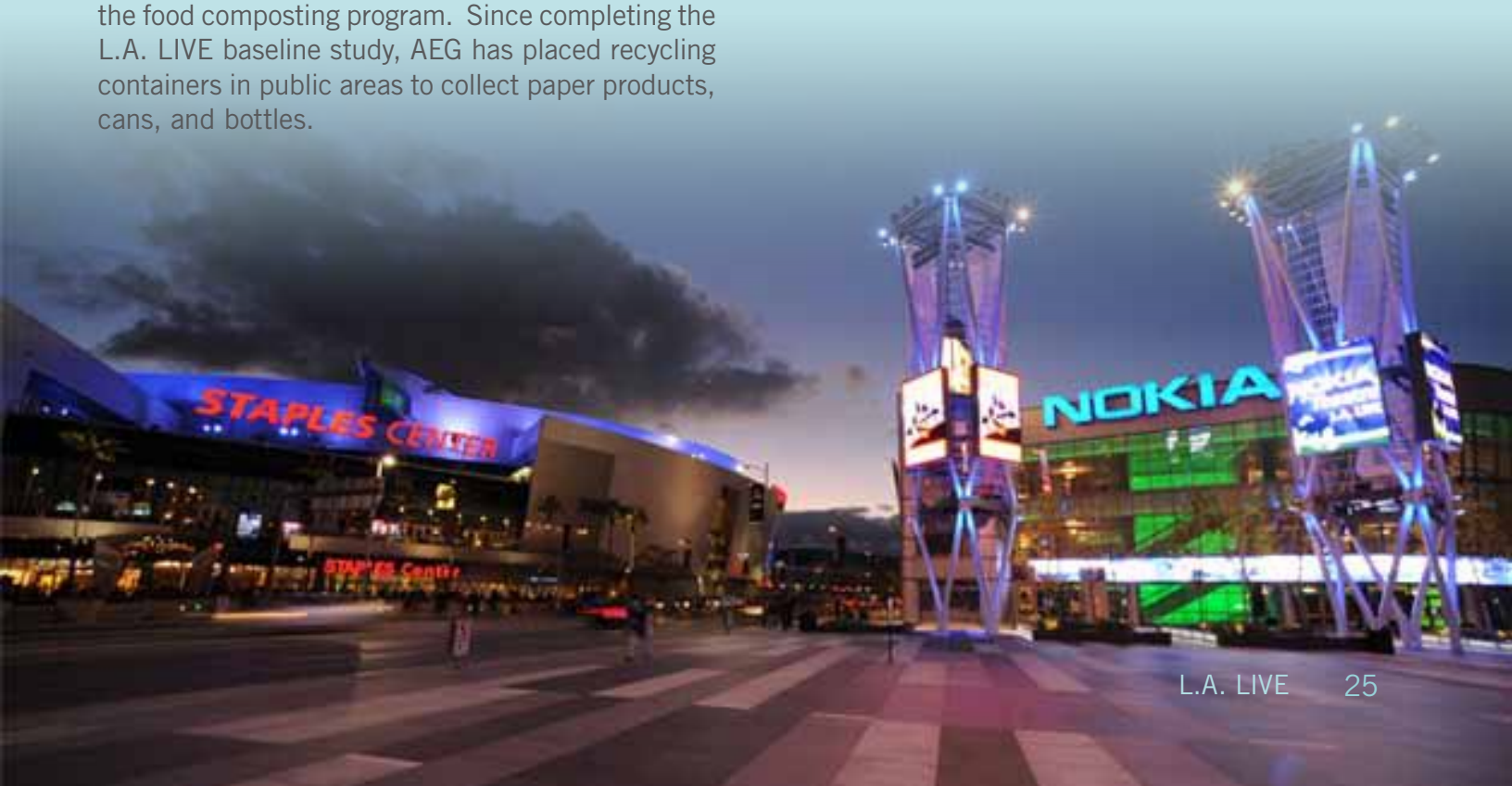
L.A. LIVE

AEG IS ONE OF THE LEADING SPORTS AND entertainment presenters in the world. AEG is a wholly owned subsidiary of the Anschutz Company, which owns, controls, or is affiliated with more than 100 of the world's preeminent facilities such as the STAPLES Center. The company also is spearheading the development of Farmers Field, a proposed 72,000-seat stadium and event center in downtown Los Angeles designed to host an NFL franchise, conventions, and special events. AEG Live, the live-entertainment division of Los Angeles-based AEG, is dedicated to all aspects of live contemporary music performance.

From 2009 to 2010, Sanitation partnered with AEG to implement waste reduction and recycling programs for their L.A. LIVE venue, including the STAPLES Center. The Sanitation Business Waste Assessment team completed a waste generation baseline of the AEG facilities and selected tenants and compiled a set of waste reduction and recycling recommendations for L.A. LIVE. The baseline study conducted by AEG and Sanitation determined that expanding the food composting program could add the largest tonnage for diversion. AEG currently is working with their restaurant tenants to implement the food composting program. Since completing the L.A. LIVE baseline study, AEG has placed recycling containers in public areas to collect paper products, cans, and bottles.

In 2010, AEG launched its AEG 1EARTH environmental program, announcing new 2020 environmental goals and releasing the industry's first sustainability report. AEG 1EARTH culminates a three-year effort to develop a measurable and quantifiable environmental program that can deliver results for improving AEG's environmental performance. AEG 1EARTH identifies AEG's environmental priorities and sets realistic and achievable environmental goals to guide company decision making. Over time, AEG Ecometrics Data Tracking System will verify whether specific measures implemented are improving environmental performance. AEG is the first company of its kind to produce an environmental sustainability report.

AEG's 2010 Environmental Sustainability Report is a snapshot of AEG's environmental performance at 20 AEG owned and managed facilities. Using the Ecometrics data from 2007 to 2009, the report takes a detailed and comprehensive look at AEG's operations and their environmental impacts. It also documents AEG's long-term goals, successes and the programs that are in place to improve its environmental performance.



WITH A POPULATION OF MORE THAN 70,000 students, faculty, researchers, and other professional personnel, UCLA is the most densely populated campus in the University of California (UC) system. A large research university with hospitals, laboratories, and housing, UCLA has a significant footprint and a complex waste stream. The University of California Sustainable Practices Policy developed by the ten UC campuses, sets an ambitious target of Zero Waste by 2020, with an interim target of 75% waste diversion by 2012. UCLA met the 2012 target, exceeding 75% waste diversion, a monumental effort that required participation from across campus. UCLA also has pursued numerous waste reduction initiatives, from clothing donations to paperless initiatives.

In 2012, UCLA developed a Zero Waste Plan that maps out how to achieve their goal of zero waste to landfill, or 95% or higher diversion by 2020. This plan is intended to be a living document and identifies additional initiatives and analyses needed. UCLA will increase recycling on the grounds, in the buildings, and expand composting to additional dining facilities. UCLA will work closely with the waste hauler to assess the current waste stream through audits and waste characterization and also establish an electronic data management system to collect and analyze data. The Recycling and Waste Taskforce will work closely with the UCLA Purchasing department to address potential waste reduction initiatives with their suppliers. One of the key initiatives is extended producer responsibility, ensuring that companies and their distributors are addressing waste along the full life cycle of a product.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

UCLA Disposal and Diversion Profile (FY 2011/2012)

Description	Tons
Landfill Disposal	**5,221**
Diversion	**31,579**
Landscape Recycling	2,231
Commingled Recycling	13,458
Capital C & D Recycling	9,200
Project C & D Recycling	1,790
Food Recycling	649
Conversion Technology (WTE)	4,251
DIVERSION RATE	**86%**

In addition to leading by example in reaching zero waste, UCLA will continue to foster collaborative alliances with major stakeholders, including the City, to address climate change and to mentor other universities and organizations on sustainability and zero waste programs.

As a result of the unique challenges of waste management in a hospital and clinic setting, Medical Centers throughout the UC system track and report their waste separately from the main campuses. Therefore, the UCLA Zero Waste Plan has a separate planning section dedicated to the UCLA Health System data and initiatives. Current initiatives within the health system include reusable totes, sharps containers, pallets, and isolation gowns; medical device reprocessing; recycling batteries, light bulbs, and ink cartridges; eliminating polystyrene from dining facilities; and shredding and recycling of HIPAA (Health Insurance and Portability and Accountability Act) paper. Currently, the health system is developing a version of the UCLA Green Office Program that is adapted specifically for clinics and medical offices.

Managing waste at a hospital poses some unique challenges in moving forward towards a Zero Waste goal. Working and partnering with other UC Medical Centers, medical facilities like Kaiser Permanente, and Practice Greenhealth, the UCLA health system will continue to improve recycling and composting and reduce waste, while increasing communication and outreach.

ACHIEVING ZERO WASTE IN THE **FUTURE**

THE CITY OF LOS ANGELES IS COMMITTED TO ACHIEVING ITS STATED GOAL OF "ZERO WASTE" BY THE YEAR 2025.

Section 3

THE CITY COMMENCED A STAKEHOLDER-DRIVEN SOLID WASTE INTEGRATED Resources Plan (SWIRP) to set the City's direction with a 20-year blueprint to eliminate the need for landfills and provide a foundation to help Los Angeles become a zero waste-to-landfill city. As part of the SWIRP effort, a set of "Guiding Principles" were developed. They are as follows:

1. Education to decrease consumption
2. City leadership as a model for zero waste practices
3. Education to increase recycling
4. City leadership to increase recycling
5. Manufacturer responsibility
6. Consumer responsibility
7. Convenience
8. Incentives
9. New safe technology
10. Protect public health and the environment
11. Equity (Environmental Justice)
12. Economic efficiency

The UCLA Engineering Extension Project Team reviewed the City of Los Angeles RENEW LA, the RENEW LA 5-Year Milestone Report, and the SWIRP, including the SWIRP "Policy, Program, and Facility Plan Summary" and the "Guiding Principles." The UCLA Engineering Extension's Project Team found that the guiding principles and the list of proposed programs and policies are generally supportive of promoting innovation, local economic growth, job creation, and awareness/education. They are consistent with developing a long-term sustainable technical and social/cultural infrastructure reflective of a "recycling and conservation-based" society that eventually can achieve a zero waste city.

The following table lists some of the major diversion programs that are in the planning and/or initial developmental stages at the Sanitation:

2012 Bureau of Sanitation Waste Reduction and Recycling Programs

Program Name	Description	Estimated Annual New Diversion	Estimated Program Implementation Date
AB 341 Mandatory Commercial Recycling	Mandatory Recycling for multifamily residences of 5 or more units and businesses generating 4 or more cubic yards of solid waste per week	For individual businesses, up to additional 30% of what is currently disposed (Note)	July 2012
Banning Single-Use Plastic Bags	Ordinance banning single-use plastic carryout bags in the City of Los Angeles	11,400 tons per year (if all 2.3 billion bags per year in City are eliminated)	Policy initiated May 2012 (Environmental Impact Analysis needed, Project Implementation, 2013)
Curbside Carpet Recycling	Collect used carpet at the curbside from residential single family	260 to 400 tons per year (1.5 to 2.5 tons per day)	Winter 2013
Curbside Mattress Recycling	Collect used mattresses at the Curbside from residential single family	2,800 to 3,300 tons per year (11 to 13 tons per day)	Fall 2012
RENEW LA	Conversion Technology to beneficially process post-recycled residual into useful products / energy	2,000 tons per day or more	First two projects in initial contract negotiation stage
Business Technical Assistance	Public-Private Partnerships (P3) to develop business-specific best management practices peer match reference models	For individual businesses, up to additional 30% of what is currently disposed (Note)	Winter 2013

The City has long recognized the critical role that conversion technologies have in an overall comprehensive integrated waste management system designed to achieve zero waste to landfill. The City has undertaken extensive steps to implement conversion technology as part of its integrated waste management effort to reduce dependence on landfills and to minimize the greenhouse gas footprint of its waste management system. In 2010, the Solid Waste Alternative Technologies (SWAT) ordinance was passed by City Council to permit Manufacturing / Light Industrial (M2) and Public Facility (PF)

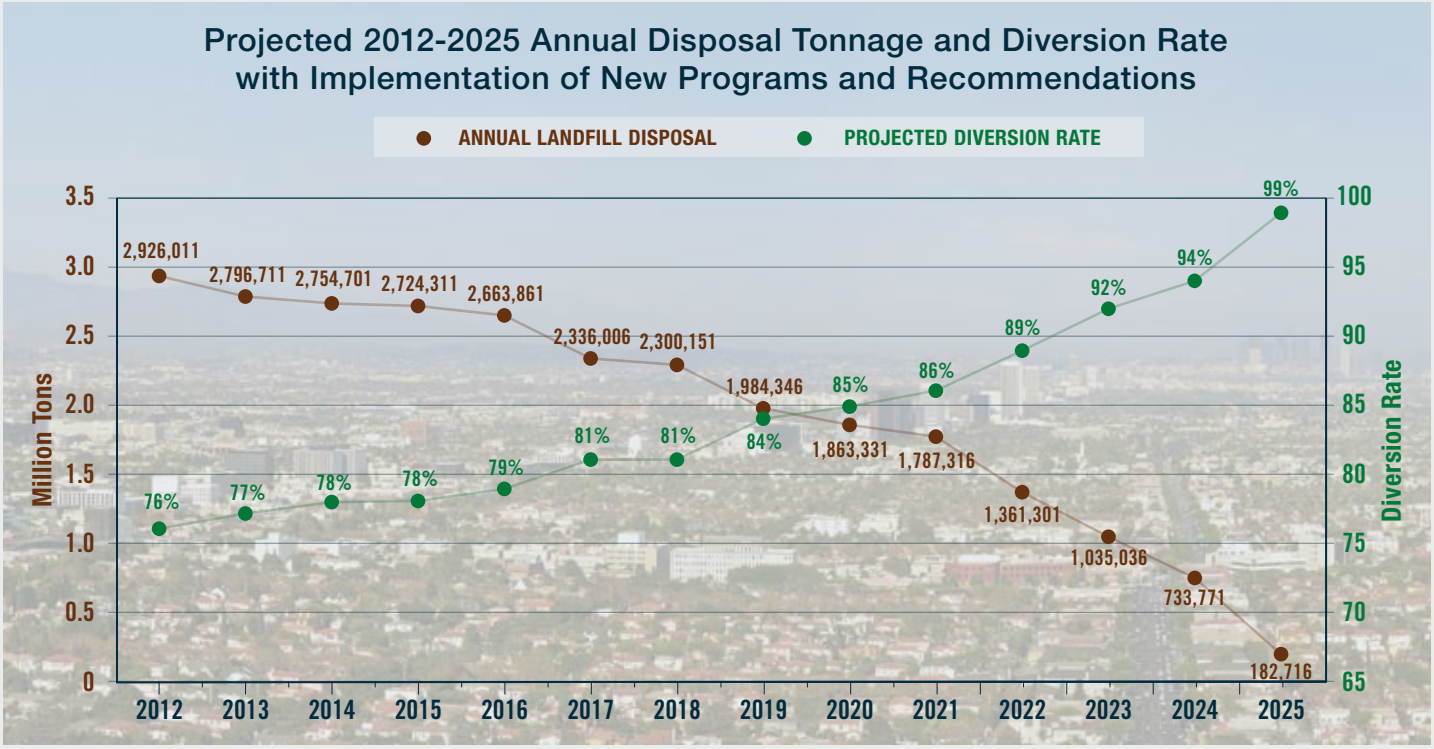
Estimates of Annual Diversion Tonnage From Major New Programs

Program Description	2012	2013	2014	2015	2016	2017
AB 341 (Businesses / Multifamily)	15,000	75,000	100,000	125,000	150,000	175,000
Plastic Bag Ban	0	0	11,400	11,400	11,400	11,400
Curbside Carpet Recycling	0	0	260	300	400	405
Curbside Mattress Recycling	2,800	2,800	2,900	3,000	3,100	3,200
RENEW LA (Integrated Facilities)	0	0	0	0	30,000	330,000
Residential Food Waste	1,500	1,500	1,750	2,000	2,250	2,500
Restaurant Food Waste	50,000	50,000	55,000	60,000	65,000	67,500
ESTIMATED ANNUAL DIVERSION TON	69,300	129,300	171,310	201,700	262,150	590.005

Note: AB 341 also combines many programs, e.g., mandatory commercial recycling, mandatory commercial recycling with franchise hauler program, business w
The key program is the implementation of AB 341 and processing the post-recycled residuals through integrated conversion technology facilities that are part of

Zones to be used for conversion technology with a Conditional Use Permit (CUP). This step is critical to expand the number of potential sites available for developing these facilities. After an extensive process of preliminary screening and technology evaluation, reference facility site visits, and reviewing the submitted RFP (Request for Proposals) documents, the City has selected two projects for development (one demonstration facility, one full commercial scale facility). The project components are being negotiated.

The Project Team determined that reaching the City's goal of zero waste is possible within the 2025 timeframe. The Project Team estimated the potential impact of the new programs, if they are fully implemented with the suggested recommendations described on the following pages.



2018	2019	2020	2021	2022	2023	2024	2025
200,000	210,000	215,000	220,000	230,000	240,000	250,000	265,000
11,400	11,400	11,400	11,400	11,400	11,400	11,400	11,400
410	415	420	425	430	435	440	445
3,300	3,350	3,360	3,370	3,380	3,390	3,400	3,450
340,750	645,000	750,000	800,000	1,200,000	1,500,000	1,750,000	2,170,000
3,000	4,000	5,000	6,000	7,000	7,500	7,750	8,000
67,000	67,500	77,500	97,500	112,500	128,250	169,250	285,000
625,860	941,665	1,062,680	1,138,695	1,564,710	1,890,975	2,192,240	2,743,295

aste assessments, education/outreach, and addresses the impact of policies such as environmentally preferred purchasing, and extended producer responsibility.
f the RENEW LA Plan.

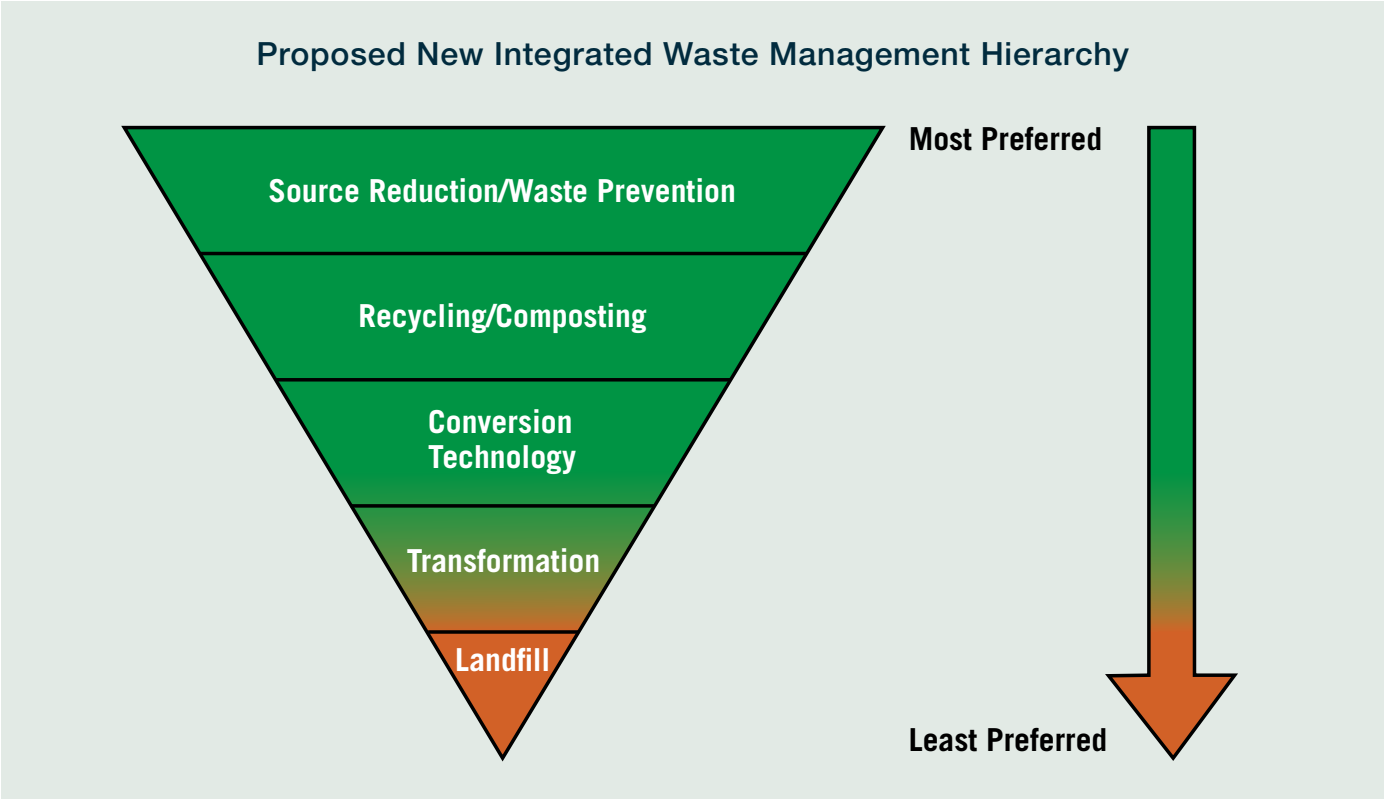
PROJECT TEAM

RECOMMENDATIONS

The Project Team recommends that the City use the international experience of best management practices in environmental education and integrated waste management implementation.

RECOMMENDATION #1 - INTEGRATED WASTE MANAGEMENT APPROACH

Adopt the revised integrated waste management hierarchy that includes "Alternative Technologies" as a key component of the waste management options used by the City to achieve the zero waste-to-landfill goal.



"Alternative Technologies" include both conversion technologies and transformation. "Conversion Technologies" are an array of emerging technologies capable of converting post-recycled residual solid waste into useful products and chemicals, green fuels like ethanol and biodiesel, and clean, renewable energy. Adopting this revised hierarchy takes into account the impacts of waste management options within a greater context of environmental sustainability and climate change. These technologies will keep materials, which cannot be source separated for recycling or composting, from reaching landfill disposal, other than a small percentage of inert residuals from the processes.

The Project Team recommends the principle of "continuous improvement" as a guiding principle in the implementation of existing and proposed programs. "Continuous improvement" refers to a Japanese management principle called "kaizen," which focuses on continuous small improvements. Commitment to the continuous improvement principle requires developing, testing, evaluation, and monitoring of environmental metrics that can be used to quantitatively measure each program's progress, preferably on an annual basis.

RECOMMENDATION #2 - INCREASED FOCUS ON COMMERCIAL AND INDUSTRIAL SECTORS

Upon reviewing the Year 2000 New Base Year Study and Waste Composition Study for the City, it is evident that the majority of the waste stream is generated by commercial, industrial, and institutional (e.g., government) entities. The existing proposed programs described in the "Policy, Program, and Facility Plan Summary" focus on the Sanitation-controlled waste streams. The Project Team recommends including a greater emphasis on the commercial and industrial sector generators. With the passage of AB 341, the focus is on mandatory commercial waste recycling by implementing source separated recycling program and/or by implementing mixed waste processing. In 2011, The City of Los Angeles has about 800 permitted waste haulers. These permitted waste haulers should be required to implement commercial recycling programs as part of their permit to operate in the City.

Under CalRecycle's AB 341, the City had the ultimate responsibility to oversee and enforce the requirements on the affected multi-family complexes and businesses. The Project Team recommends expanding the current City-operated Business Waste Assessment (BWA) Program to supplement the mandatory education and outreach efforts that will be required of the City-permitted commercial haulers under the new hauler franchise system, currently being developed. The BWA Program also can educate and assist businesses to focus on "source reduction and waste prevention," the most preferred option in the integrated waste management hierarchy (the option that provides the greatest impact on greenhouse gas emissions).

Other practices, such as environmentally preferred purchasing, source reduction, and other programs that divert waste from landfill, should be promoted when producing educational outreach materials.

The City can use data and information from its business-specific best management practices case studies and other available materials to assist businesses with implementing waste reduction programs. Additionally, the program should be expanded to address energy and water conservation and other sustainability issues that would help reduce the greenhouse gas emissions of business entities in the City.

The potential diversion tonnage impact from mandatory commercial recycling depends upon the current level of existing programs and on the type and volumes of waste generated by each specific business. Based upon the recovery experience of local mixed waste material recovery facilities, an average diversion rate of 30% is potentially achievable through source separation or other programs. Coupled with internal source reduction and environmentally preferred purchasing practices, higher levels may be achievable. The Project Team recognizes that each business should be allowed to determine what their appropriate programs are, given their individual operational and resource constraints, e.g., space limitations, cost and labor constraints, health and safety risk issues (as in a medical center), etc.

Based upon the examples of successful public-private partnership projects as previously described, the Project Team also recommends the expanded use of developing business-peer match models to leverage the City's limited resources in working with the commercial and industrial sectors to increase sustainable practices within a specific industry. The project team recommends prioritizing the expansion of the Green Business Certification program to enhance efforts to promote and reward the Los Angeles business community and to target the largest industry types and work with the largest individual generators (shown in the table below) who can take on a leadership role.

The City needs to investigate the possibility of working with the City Clerk to expand the City's current business licensing database to meet the AB 341 business compliance monitoring requirements in conjunction with developing the AB 341 City-permitted commercial hauler reporting requirements. The Project Team recommends that the City of Los Angeles continue to share the database tools with the member cities of the Los Angeles Regional Agency (LARA) and assist with developing basic educational outreach materials that can be customized by the member cities. Part of the overall effort should focus on assisting businesses to understand and calculate sustainability metrics and benefits that result from implementing waste reduction and recycling programs. The City can incorporate existing U.S. EPA or other online sustainability metric calculators into its outreach and education materials to emphasize the link between waste management and resource conservation, greenhouse gas emissions, and climate change.

The City must implement its AB 341 programs in a way that is most appropriate to the City, based on its business makeup and consistent with the potential franchise trash collection system that will be part of the AB 341 program implementation plan over the next five years. There also should be recognition of issues related to the number and diverse types of businesses, the business license system, and the City's available resources.

City of Los Angeles Disposal Tonnage and Percent by Business Type CalRecycle Waste Characterization Database (1999)

Business SIC Grouping	Annual Tons Disposed	Percent of Total Nonresidential Disposal
Retail Trade-Restaurants	293,834	14.4%
Services-Medical / Health	209,994	10.3%
Retail Trade-Other	164,561	8.1%
Services-Business Services	144,089	7.1%
Services-Education	128,231	6.3%
Services-Other	119,332	5.9%
Construction	118,755	5.8%
Retail Trade-Food Store	106,062	5.2%
Services-Other Professional	94,927	4.7%
Wholesale Trade-Durable Goods	63,603	3.1%
Manufacturing-Other	61,752	3.0%
Wholesale Trade-Nondurable Goods	53,222	2.6%
Finance / Insurance / Real Estate / Legal	49,741	2.4%
Retail Trade-Building Material and Garden	46,144	2.3%
Manufacturing-Apparel / Textile	43,879	2.2%
Services-Hotels / Lodging	43,678	2.1%
Manufacturing-Printing / Publishing	39,441	1.9%
Transportation-Other	36,269	1.8%

Business SIC Grouping	Annual Tons Disposed	Percent of Total Nonresidential Disposal
Services-Motion Pictures	27,133	1.3%
Communications	25,947	1.3%
Trucking and Warehousing	23,190	1.1%
Public Administration	20,280	1.0%
Manufacturing-Instruments / Related	17,022	0.8%
Retail Trade-Auto. Dealers and Service Stations	15,243	0.7%
Manufacturing-Food / Kindred	14,661	0.7%
Manufacturing-Furniture / Fixtures	14,253	0.7%
Manufacturing-Electronic Equipment	12,181	0.6%
Manufacturing-Primary / Fabricated Metal	11,034	0.5%
Transportation-Air	6,884	0.3%
Manufacturing-Chemical / Allied	6,616	0.3%
Manufacturing-Lumber and Wood Products	5,847	0.3%
Agriculture / Fisheries	4,542	0.2%
Retail Trade-General Merchandise Stores	3,805	0.2%
Mining	3,544	0.2%
Utilities	3,029	0.1%

Reference: http://www.calrecycle.ca.gov/WasteChar/wcabscrn.asp

RECOMMENDATION #3 - COMMERCIAL SECTOR EDUCATION AND OUTREACH

AB 341 requires that a jurisdiction provide education and outreach. In addition to working with the haulers to fulfill the AB 341 requirements through the franchise collection system that is being implemented, the Project Team recommends that Sanitation develop a business assistance website to be an AB 341 resource site to help businesses develop their programs. The site could provide the following:

- An overview of the requirements of AB 939 and AB 341, and the City's specific programmatic requirements for compliance and reporting
- Contact list, including names, call numbers, websites, and additional information
- List of independent recyclers, including contact information and types of material the recycler collects, with the list searchable by zip code and service area
- Business-specific technical guides developed by Sanitation on best management practices for source reduction, recycling, and other environmental programs
- Enable a business to request an appointment online for a Sanitation waste reduction and recycling assessment specialist to provide an on-site technical assistance visit
- List of case studies, peer match models, links to other programs, and other technical resources
- Model Environmental Preferred Purchasing policy for business use (Sanitation can provide a list of common products and supplies that the City is purchasing as an environmentally preferred product)
- On-line Sanitation training programs on source reduction, recycling, composting, and conversion technology, etc., that businesses can use to train their personnel
- On-line calculator to help a business calculate basic environmental metrics, e.g., diversion rate and greenhouse gas emissions impact, and other sustainability metrics

RECOMMENDATION #4 - LOS ANGELES UNIFIED SCHOOL DISTRICT EDUCATION / OUTREACH

In addition to increasing the existing outreach and education effort to its residents and businesses, the City should continue to work with Los Angeles Unified School District (LAUSD) to revise the current "recycling" curriculum to incorporate the more comprehensive "integrated waste management" approach, and specifically incorporate conversion technology / transformation as part of the curriculum. Waste prevention and source reduction should be included with the teaching of recycling. The current curriculum needs to emphasize that waste management practices impact the emissions of greenhouse gas and climate change. The waste management and recycling curriculum should be incorporated under the overall umbrella of environmental sustainability and not as a stand-alone topic. The City should include City-specific programmatic information, such as the implementation of the plastic bag ban, in its overall outreach and education effort as part of the source reduction element.

In addition to raw materials savings, the curriculum should cover other beneficial environmental impacts associated with source reduction and recycling, and the interlinked impact on sustainability climate change (e.g., energy savings realized from less pumping and treatment of water due to reduced water usage, etc.).

In reviewing Sanitation's curbside recycling program, the Project Team noted that the level of contamination for the source-separate recyclables ("Blue Bin") is approximately 30% (by weight). This high percentage of contamination (non-recyclable trash) in source-separated recyclables can cause cross-contamination, requiring increased processing by the materials recovery facilities (MRFs), and reduced income to the City through fewer sales of recyclables. The Project Team recommends additional outreach and education to the residents to emphasize the importance of the quality of recyclables. The outreach and education efforts should be supplemented with increased enforcement efforts, and the City should be working closely with the selected outreach and education contractors.

Sanitation should incorporate basic sustainability metrics related to greenhouse gas emissions in addition to using traditional tonnage and volume measurements in assessing the progress of its waste reduction and recycling programs. This should include a description of environmental benefits (including cost benefits) to which a resident or a business can understand and relate.

RECOMMENDATION #5 - IMPLEMENTING RENEW LA TO PROMOTE A RECYCLING-BASED SOCIETY

In the implementation of the RENEW LA program, the Project Team recommends examining the feasibility of incorporating the conversion technology project(s) within an "EcoPark" context to promote the concept of a "recycling-based society." The recommended "EcoPark" concept is based upon the existing projects developed in Japan, where the principle of a "recycling-based society" is promoted, and where recycling and waste management facilities and EcoPark developments are considered an integral part of the community.

An "EcoPark" is a dedicated waste recycling industrial park in which various types of waste streams are sent and recycling and materials recovery is maximized by a suite of complementary technologies and facilities. Diverse waste streams such as "black bin" mixed waste (from residential and non-residential sources), construction and demolition waste, household hazardous waste, universal waste and e-waste, source-separated recyclables, tires, bulky items, and etc. would be sent to this single "EcoPark" location for disassembly, refurbishment, processing into feedstock, reuse, recycling, secondary manufacturing of value added products, chemical products, and/or energy recovery. An "Ecopark" approach would create manufacturing and skilled labor jobs in addition to maximizing diversion from landfill. The Japanese model indicates that a landfill diversion rate of over 90% is achievable from such a holistic approach.

This approach would be consistent with the "MRF-First" policy that promotes maximizing recycling before the non-recyclable materials are used for energy recovery. This concept also recognizes the objective of minimizing the disposal of materials that potentially could generate greenhouse gases from landfills and would be consistent with the climate change objectives of AB 32 (California Global Warming Solutions Act) and AB 341 (Mandatory Commercial Recycling).

For standalone conversion technology projects within an "EcoPark" context, the Project Team recommends that there be a significant community interface in developing, building, and operating the facilities. The "interface" should be designed to incorporate the community so that the community is an integral part of the overall project and facility, such as a community swimming pool and thrift store within a Japanese gasification WTE facility, as seen above. Although the City is committed to implementing waste reduction and recycling programs as the preferential methods (consistent with

the waste management hierarchy) of diverting waste from landfill, the City recognizes that conversion technology is an integral part of the overall approach to achieving zero waste to landfill. This is consistent with the integrated approaches used by the most environmentally and technologically aware countries with the highest landfill diversion rates in the European Union and in Asia.

The Project Team recommends that the City take a leadership role with the RENEW LA program to implement conversion technologies. The Project Team also recommends that the City look at the feasibility of potential Federal or State funding to create a "job training" program in which these initial facilities can be used for providing the training of technical skills needed for this new industry. This is a practice that is common in the European Union and in Asia. These projects also can be used by university programs to provide summer internships and work study programs. These programs will support the development of the soft infrastructure needed to help expand the conversion technology industry.

RECOMMENDATION #6 - LEGISLATIVE CHANGE

The City in collaboration with the Los Angeles County Department of Public Works and the solid waste industry should use its political influence at the statewide level to promote and establish conversion technologies as part of the integrated waste management hierarchy. This is critical to ensure the RENEW LA Plan is fully implemented.

The current definition of "gasification" in the Public Resources Code is an issue with the Sanitation's effort in developing conversion technology projects that use thermal gasification. The Project Team recommends that the City address and modify the current definition of gasification in the California Public Resources Code through its State Assembly and Senate representatives. The current definition of gasification in the California Public Resources Code states:

40117. "Gasification" means a technology that uses a non-combustion thermal process to convert solid waste to a clean burning fuel for the purpose of generating electricity, and that, at minimum, meets all of the following criteria:

(a) The technology does not use air or oxygen in the conversion process, except ambient air to maintain temperature control.

(b) The technology produces no discharges of air contaminants or emissions, including greenhouse gases, as defined in subdivision (g) of Section 38505 of the Health and Safety Code.

(c) The technology produces no discharges to surface or groundwater of the state.

(d) The technology produces no hazardous waste.

(e) To the maximum extent feasible, the technology removes all recyclable materials and marketable green waste compostable materials from the solid waste stream before the conversion process, and the owner or operator of the facility certifies that those materials will be recycled or composted.

(f) The facility where the technology complies with all applicable laws, regulations, and ordinances.

(g) The facility certifies to the Board that any local agency sending solid waste to the facility complies with this division and has reduced, recycled, or composted solid waste to the maximum extent feasible, and the Board makes a finding that the local agency has diverted at least 30 percent of all solid waste through source reduction, recycling, and composting.

This definition is flawed with technical issues and conflicting regulatory requirements; e.g., "no discharges of greenhouse gas" can translate to disallowing a wall plug for a computer to use electricity from the local utility; or "technology produces no hazardous waste" which is unenforceable because generating hazardous waste is covered by existing law, which does not prohibit generating waste, but requires meeting the requirements for properly managing generated hazardous waste, etc. This definition is taught as a case study in environmental law courses as an example of legislation developed by people lacking in technical scientific expertise, with no understanding of the unintended consequences of the regulatory uncertainty, and unmindful of the negative financial impact to the State of California when research and project development funds goes to other states.

The Project Team recommends that the City address the regulatory issues through its State Assembly and Senate representatives.

RECOMMENDATION #7 - ADOPT "MRF FIRST" POLICY TO RENEW LA THERMAL TECHNOLOGY PROJECTS

The Project Team recommends that the City participate in developing the "MRF First" requirements for what would constitute a "post-recycled residual," which would qualify as a renewable feedstock" for producing energy in the California Renewable Portfolio Standard (RPS).

For the City's RENEW LA project, the City is requiring that the waste-to-energy projects use post-recycled (black bin) waste, currently going to landfill as feedstock. Potential feedstock received from other jurisdictions at RENEW LA conversion technology facilities should meet the same standard.

At present, there is no defined standard for what constitutes "post-recycled residuals." The Project Team recommends that the City work with the Governor's Office, the Energy Commission, and CalRecycle to use the following standard that recognizes the major factors each conversion technology project must consider:

1. Implementing MRF-First (post-recycling residuals) Policy
2. Recognizing of the operational flexibility needed to address the ever-changing dynamic aspects of waste management
3. Overriding operational considerations (e.g., health and safety)
4. Understanding local/regional variations in waste composition, volumes, and wastesheds
5. Existing/planned diversion programs
6. Availability of markets for recyclables
7. Economic and technical feasibility
8. Considering the local/regional "integrated waste management infrastructure" and the IWM hierarchy (in Recommendation #1)

Proposed RPS Requirements for Conversion Technology Feedstock:

Part I: Source Separated and/or "MRFed" Wastestream

Non-combustion thermal technologies that convert municipal solid waste (MSW) to a syngas for the purpose, or secondary purpose, of generating electricity shall be eligible to participate in California's Renewable Portfolio Standard (RPS) if the facilities that generate energy for sale: (a) meet all air and water quality regulations and permitting requirements enacted by state and local authorities, including air districts, for technologies generating electricity, and (b) the facility demonstrates and certifies that the feedstock used to produce the synthesis gas (syngas) has been either (i) processed through a Materials Recovery Facility (MRF), which, to the maximum extent feasible, has removed recyclable materials (e.g., post-recycled residuals), and/or (ii) that the feedstock is comprised of post-recycled residuals from a source-separated recycling program.

Requiring that a wastestream be comprised of "post-recycled residual[s]" and meet the criteria of recycling to the "maximum extent feasible" is satisfied by the following:

1. A conversion technology facility demonstrating "that the residential derived feedstock is comprised of post-recycled residuals from a source-separated recycling program," that the source of the waste, the jurisdiction of origin, has a source-separated program for the residential sector, and/or that the residential waste stream was sent to a mixed waste processing facility for recovering recyclables.

2. A conversion technology facility can demonstrate that non-residential sector feedstock comprises post-recycled residuals and has met the requirement of "recovering recyclables to the maximum extent possible" by demonstrating that the jurisdiction of origin has a mandatory source-separated non-residential (e.g., commercial) recycling program, and/or that the non-residential wastestream is processed for the recovery of recyclables at a mixed waste processing materials recovery facility.

3. A jurisdiction determined by CalRecycle to be in compliance with the AB 341 mandates (mandatory commercial recycling provisions) shall be deemed to have met the "maximum extent feasible" recycling requirement for the non-residential (e.g., commercial/industrial) sector.

Part II: Non Source-Separated and/or Non-"MRFed" Wastestream

Waste from jurisdictions not containing post-recycled residuals (e.g., mixed waste from non-source-separated residential and/or non-residential sectors) can qualify as having been recycled to "the maximum extent possible" and as MSW feedstock for participating in the RPS if the thermal conversion process is part of an overall "integrated materials recovery facility" that meets the following requirement:

Waste from the non-source-separated residential sector and/or non-residential sector that is thermally converted will qualify for RPS credit if the wastestream goes to an "integrated materials recovery facility" that recovers recyclables during processing, converts a portion of the organics to either compost and/or is anaerobically digested, provided these processes occur as part of preparing the remaining non-marketable residuals, which are then prepared as a feedstock for thermal conversion to energy.

Note: An integrated materials recovery facility with thermal processing reflects a "MRF First" policy. An example is the European Union "MBT" (Mechanical Biological Treatment") facility, which, first, processes the post-recycled residuals from the residential and commercial sectors to recover additional recyclables that are missed by the source separated program, and then processes the remaining non-recyclable wastestream into a "wet fraction" for composting and/or anaerobic digestion, and, then, lastly, processes the non-recyclable, non-compostable/non-digestible fraction into a feedstock for thermal conversion. This approach reflects the U.S. EPA's non-landfill operational aspects of an integrated waste management hierarchy into a single facility (the facility can be bifurcated by permits so that different operations may be located at different locations and fall within operational parameters specified under permits).

This policy approach is modeled after the policies and programs that are considered the best management practices for integrated waste management in the European Union and in Asia. This approach is also consistent with the findings of the U.S. Navy's Waste-to-Clean Energy, Initial Decision Report (Technical Report TR-2367-ENV, 2011).

RECOMMENDATION #8 - SUPPORT OF LANDFILL DIVERSION POLICIES AT THE STATE LEVEL

The City needs to continue supporting State policies, actions and activities that foster decreased landfill dependence. The City should promote and support the implementation of Extended Producer Responsibility, Environmental Preferred Purchasing programs, and Pay-as-You-Throw programs. In the longer term, the City should support policies and legislation that prohibit disposing recyclable materials as these are wastes that contribute towards landfill gas generation. Disposing waste that has potential energy and/or other beneficial value (e.g., chemical products) should also be prohibited. This is consistent with the goals and objectives of AB 32 (California Global Warming Solutions Act) and AB 341 and reflects the program and policy goals that have been adopted by the member countries in the European Union and by Japan. Landfills should be recognized as a resource, as an integral part of the overall integrated waste management system, and as the final backup option in the overall waste management system.

To create greater economic incentives for waste reduction and recycling, the City should raise the "franchise fee" (for disposal going to landfills). Additional revenues should be used to develop AB 341 programs such as expanded technical assistance efforts for businesses. The funds also could be earmarked to develop an "EcoPark" project.

RECOMMENDATION #9 - EMERGENCY AND DISASTER DEBRIS MANAGEMENT PLANNING

The project team recommends that the City examine the potential volume, tonnage, and waste types of disaster debris generated by a "low probability, high impact" event, and determine how the disaster debris can be managed safely, efficiently, recycled if possible, within the overall context of an integrated waste management system. The role that private industry and governmental agencies involved with emergency planning and operations play in addressing the long-term disaster debris management effort aftermath of any disaster should be well planned and organized.

Conversion technologies should be an integral part of the disaster debris management infrastructure. Incinerators and thermal conversion technologies solve volume reduction and mitigate health and other issues related to biohazards concerns. Local and regional landfills should only serve as staging areas for disaster debris. Adequate landfill disposal capacity is essential as a safety net for managing disaster debris, not only during emergencies but also during the City's recovery period.

The recommendation above is based upon the lessons learned from the March 13, 2011 earthquake and tsunami mega disaster in Japan. As part of the assessment of best management practices in integrated waste management and conversion technologies for the engineering curriculum for the UCLA Recycling / MSW Management Program, the program's Advisory Board and members of this Project Team had the unique opportunity to visit the Ishinomake Area disaster site. They visited the disaster debris processing site and received extensive briefings on lessons learned.

RECOMMENDATION #10 - LIFE CYCLE COSTS

The Project Team recommends using the holistic life cycle cost approach to determine the overall financial, programmatic, and environmental costs and benefits. More than ever, programs need to be cost-effective and leveraged to the maximum extent possible over the long term, given the fiscal constraints that government and industry have in the current economy. Existing and new programs must be consistent within the overall umbrella of an integrated waste management approach, taking into account environmental justice issues, within the context of climate change and sustainability planning that is ongoing within individual businesses, and within each department in the City.

Many benefits may be difficult to quantify monetarily, for example, jobs created by spin-off businesses serving RENEW LA project, economic growth leveraged through public-private partnerships that serve as peer match reference mentors, or lower waste management costs resulting from greater awareness and willingness by citizens to implement sustainable practices that result from improved environmental educational programs. Nevertheless, the true cost of effective environmentally sustainable practices and programs must be reflected. Conversely, the role of government to create a long-term infrastructure that supports zero waste policies, technical innovation and risk and to continually improve the overall solid waste management system are among the most important mandates for the City.

PROJECT TEAM

FINAL NOTE

ZERO WASTE IS NO LONGER A DREAM – IT IS A FAST-APPROACHING REALITY. The City has made great strides over the past few years towards a more sustainable community. Through waste reduction and recycling, the City and local businesses have pioneered programs and practices that will push the City towards a greener future. Although the City has surpassed the 75% diversion rate milestone ahead of schedule, the remaining 25% will be the most difficult yet.

The Project Team wishes to recognize the dedication of the City staff and the vision of the leadership of the City that is responsible for the remarkable achievements that the City has accomplished in the last 25 years towards a zero waste goal. The City must continue its leadership role to promote innovation and commit to the principle of continued improvement of programs and policies to establish the long-term supportive infrastructure. Only when environmental sustainability is at the forefront of the people's priorities will zero waste be a sustainable practice. We hope that the City understands the scope and level of effort that is needed to achieve a zero waste goal and will commit the necessary resources to achieve this admirable goal.

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