RENEW LA

Recovering

Energy

Natural Resources *and*

Economic Benefit *from*

Waste *for*

COUNCILMAN GREIG SMITH

A Resource Management Blueprint for the City of Los Angeles

2005 - 2025

MAILING ADDRESS:

CITY HALL
200 N. Spring Street
Room 405
Los Angeles, CA 90012
(213) 473-7012

City of Los Angeles

DISTRICT OFFICE:

NORTHRIDGE
18917 Nordhoff St.
Suite18
Northridge, CA 91324
(818) 756-8501

Councilmember
Greig Smith
Twelfth District

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For over 200 years Americans have enjoyed the freedom of open space and vast resources. During plentiful times, governmental leaders have considered trash to be a problem to be "managed" and the easiest and cheapest way to get rid of it was simply to dig a hole, throw the trash in it and cover it up. We now know that this process of landfilling is environmentally unsound, and wastes precious virgin resources. We also have run out of open space in the urbanized parts of America and no longer have the option.

Cities around the world are changing the way they view trash. Enlightened cities consider trash a resource to be used for economic benefit, not a problem to be dealt with. In my travels, I have seen these cities manage their *resources* – not their waste. They actively reduce refuse and maximize their reuse and recycling opportunities. They then convert what's left back to beneficial use for society in the form of alternative fuels, renewable green energy, soil amendments and feedstocks for manufacturing processes.

As a world-class city, Los Angeles needs to be at the forefront of technological advancement in dealing with its trash. The time has come for Los Angeles to take the lead and forge a path to move beyond the 200-year-old, environmentally damaging, system of landfilling – to a new paradigm of reuse and zero waste. RENEW LA is the roadmap to this paradigm.

Greig Smith

GREIG SMITH
Councilman, Twelfth District

P.S. Please don't trash this plan…recycle it.

Recyclable and made from recycled waste.

Acknowledgements

- *Principal Author*: Greig Smith
  Los Angeles City Councilman
- *Report Consultant*: Clements Environmental Corp.
  Chip Clements
  Ivy Guaño
- *Contributing Authors*: Mitchell Englander
  Nicole Bernson
- *Contributing Researchers*: University of Southern California
  School of Public Policy, Planning and Development

  Dustin Shiau
  Cole Cannon
  David Lee

Getting To Where We Need To Go (The Blueprint)

Efforts on the national and state levels to reduce packaging, mandate "Extended Producer Responsibility" (EPR), and encourage reduced consumption patterns by our populace, are targets for other efforts. However, this plan focuses on the "end of the pipe" so to speak, the material still going to landfill disposal. It relies on two key areas of action:

- the enhancement and growth of existing diversion programs; and
- the development of CT facilities to process residual material

This report makes no recommendations regarding the types of CT to be developed, but highlights the five basic ones currently being evaluated and developed in Los Angeles and other U.S. cities, and already in operation in many other countries. They are:

- Gasification/Pyrolysis
- Anaerobic Digestion
- MSW Composting
- Autoclaving
- Fermentation

In order to achieve a 90^{+}% diversion rate, the RENEW LA blueprint targets the largest of the disposal wastestreams: the black can material from single family homes, multi-family, and commercial waste.

The plan recommends development over the next 20 years of seven regional CT facilities, preferably with one located in each of the six refuse collection districts (Harbor, South Los Angeles, Western, North Central, East Valley and West Valley), plus one sited as opportunity presents, including perhaps in a neighboring jurisdiction. Constructed initially to process 500 to 750 TPD, these plants would be expanded over time to larger capacities in the 1,250 to 3,000 TPD range, with a total cumulative capacity of 14,500 TPD_5. Depending on the mix of CT developed, these plants could generate 100-340 MW of renewable energy towards DWP's 20% Renewable Energy Standard (RPS) goal.

Coupled with aggressive efforts to increase source-separation programs, and with the addition of pre-processing through Material Recovery Facilities (MRFs) or autoclave systems, these CT plants could achieve the results shown in the table on the following page - an unprecedented, but achievable 93% diversion. Along with this high level of diversion would come:

- Drastic reduction in truck and rail transportation and their associated air quality and traffic congestion impacts
- Creation of construction jobs and permanent operational "green collar" jobs in pre-processing plants, CT facilities, and re-manufacturing operations where beneficial use is made of recovered material
- Conservation of limited, virgin resources
- Significant reduction in environmental impacts from landfills
- Equality in shared system components and responsibilities
- Generation of green, renewable energy

RENEW LA PLAN
(Zero Waste Target 2025)

Year	(TPD) (***) Citywide Generation(*)	Existing Diversion Programs(**)	Total New Diversion	Final Disposal Tonnage	Overall Diversion (%)
2005	37,959	23,673	0	14,286	**62**
2010	41,910	26,137	2,365	13,408	**68**
2015	46,272	28,857	6,955	10,460	**77**
2020	51,088	31,861	12,675	6,552	**87**
2025	56,405	35,177	17,085	4,143	**93**

(*) Assumes 2% growth in each sector per year due to population and commerce increase
Year 2005 based on actual tonnages reported by Bureau of Sanitation for 2002 then extrapolated at 2% per year to 2025

(**) Assumes 2% growth in existing programs per year

(***) Assumes 5 days per week

Existing programs

With RENEW LA programs

Economics of the Plan

On the surface, there appears to be no "cheaper" waste management system than a hole in the ground, which has been and continues to be the bedrock of our arcane waste management system. With local landfill tipping fees still in the $20-$30 per ton range, perhaps the lowest of any metropolitan area in the U.S., it may *seem* foolhardy to propose a new system based on CT facilities with tipping fees in the $50 per ton range.

However, as detailed in this plan, several points show otherwise:

- This plan proposes not the *cheapest* system, but the *highest and best* system. A true cost/benefit analysis, with all the "externalities" included (**Costs:** transportation impacts, health impacts, environmental degradation, resource depletion, future liabilities; **Benefits:** job creation; home-grown, renewable fuel and energy; resource conservation), would show that the total societal cost of the landfill-based waste disposal system is much higher than the posted tipping fees. In fact, it could actually be more expensive than a new system based on CT and maximum recovery of resources.
- As a society, we have successfully made a similar paradigm shift with substantially higher costs when we adopted AB 939 and implemented the current diversion programs and infrastructure.

- The technologies proposed here are long-term solutions which will ultimately compete, not with cheap local landfills (which are rapidly filling), but with transfer and long haul by truck or rail to remote desert landfills. As calculated by the Los Angeles County Sanitation Districts, their complete rail haul system will cost $60 per ton (present dollars), or nearly $70 per ton (with inflation) when it starts operating in late 2009. Local CT facilities could compete well in this range, and some indicators show it considerably lower.

Therefore, in the long run, and in our drive for renewable, sustainable living, the highest and best system is actually the most effective, efficient, and desirable.

Policies and Action Items

This plan will not succeed without strong leadership from the City Council, and support from our State and Federal representatives. Bold actions will be required to facilitate a transition to the new paradigm, particularly in the initial years, when "cheap" landfills are still available.

To facilitate the transition from a disposal to a recovery based system, it will be necessary for the City to adopt policies that either "incentivize" diversion activities, "penalize" disposal, or both. The RENEW LA plan presents over 50 new or revised policies for consideration, as well as highlighting the most important 12 to be adopted during the critical first five years (2005-2010). Highlights include:

- Establish a RENEW LA oversight committee
- Adopt the RENEW LA blueprint and a Zero Waste Policy
- Modify zoning codes to facilitate project development
- Site and develop the first two CT plants
- Mandate a reduction in City-collected MSW going to the Sunshine Canyon Landfill over the next five years from the current 3,500 TPD_5 to 500 TPD_5.
- Provide reductions on City taxes based on companies' recycling performance
- Add residential foodwaste to the green can program
- Expand commercial and multi-family pilot recycling programs

Education and Consensus

Finally, this plan provides a structure around which to build consensus. In doing so, it is important that all parties be heard, that all opinions, for and against, be included and valued. This plan will change over time and with ensuing discussions – and it should! In a dynamic world, the handling of our resources must change, and for the better, or we face a bleak future.

A key ingredient to success will be education. Not only of our school children, and our residents, but also of those in the waste and recycling industries, and the environmental community who have fought so hard and well to get us where we are.

Equally important, we must inform our elected officials, whose leadership and vision will be critical in moving forward.

One key aspect of public education and outreach will be the City's Neighborhood Councils. These strategic Councils will be critical in carrying the vital elements of the plan to their stakeholders. The Neighborhood Councils will also act as focal points and public forums for the successful siting and development of CT facilities and other program components.

With education comes knowledge, with knowledge comes action, and with action comes the fundamental change we need to preserve our living planet for future generations in the City of Los Angeles.

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SECTION 1

EXECUTIVE SUMMARY

"Some people see things as they are and say why? I dream of things that never were and say why not?"

Robert Kennedy

We live in a time of unprecedented opportunity - the opportunity to create a new system of resource management based on the concept of "Zero Waste". This new paradigm is not about sacrifice, but opportunity. Not about doing with less, but doing more with what we already have - and in the process creating a new "home-grown" industry in the City of Los Angeles.

It's about **R**ecovering **E**nergy, **N**atural Resources, and **E**conomic Benefit from **W**aste for **L**os **A**ngeles - "***RENEW LA***".

Much of the recent landscape throughout California has been dominated by measures to comply with AB 939, the California Integrated Waste Management Act of 1989. In 2002, the City of Los Angeles generated a total of 9.3 million tons of Municipal Solid Waste (MSW), diverted 5.8 million tons of that total, and disposed of 3.5 million tons - for an official 62% diversion level. This represents 22,000 TPD_5 (tons per day, five days per week) diverted from landfills. In 1994, the City of Los Angeles raised the bar even further by adopting a 70% diversion goal to be achieved by the year 2020.

This is the good news.

Conversely, the City of Los Angeles is in some ways a victim of its own success in that the growth in population, commerce and per capita waste generation has kept pace with all AB939 efforts. This is reflected in the fact that today, despite its best recycling efforts, the City is still disposing of roughly the same amount of waste that it was in 1990 - about 14,000 TPD_5.

The City has a long way to go to create a new paradigm of sustainability, resource conservation, maximum material recovery, environmental protection, and renewable energy - a system in which the concept of waste itself is transformed to one of resource management.

The purpose of this plan is to create just such a paradigm and a concrete strategy to get there.

Creating a New Paradigm

To create a new paradigm in the City of Los Angeles by 2025 for the management of our resources, currently known as solid waste, requires a bold shift from a system concept of "waste disposal" to one of "resource recovery", a shift not just in technology, but in behavior, attitude, and consciousness as well.

This "blueprint" lays out a course of action for the next 20 years. In doing so, it builds on the key elements of our existing programs and infrastructure, and combines them with new systems and conversion technologies (CTs) to achieve an unparalleled level of resource recovery (without combustion) in the form of traditional recyclables; soil amendments; and renewable fuels, chemicals, and energy. The plan also achieves massive reductions in the quantity and environmental impacts of residue material disposed in landfills.

To successfully implement this blueprint will require the support of political leaders, the Bureau of Sanitation, the waste industry, and the populace as a whole. With this plan, the City is undertaking a "systemic change" in its historic and archaic way of doing things - leading to the creation of a new system. This is not done lightly or without risk. As one famous leader said:

"There is nothing more difficult to carry out nor more doubtful of success nor dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all who profit by the old order, and only lukewarm defenders in all those who would profit by the new order."

Machiavelli, 1513

This new paradigm will carry us beyond the current traditional waste management hierarchy of reduce, reuse, recycle, and dispose - to a more overarching system of beneficial use of resources. This includes a focus on the management of the material remaining *after* traditional recycling programs (i.e. curbside recycling, greenwaste composting, etc.); the material that is still going to landfills for disposal in prodigious amounts. The recycling, refining and re-manufacturing of this material requires a broader definition of resource recovery including the environmentally responsible conversion to energy or new "bio-based" products.

This program must include not only new technologies, but new policies, and education and public outreach programs to enable and support the transition to a new system and means of benefiting from our waste.

Zero Waste Goal

The goal of zero waste as defined in this plan is to reduce, reuse, recycle, or convert the resources 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.

Landfills in the Zero Waste system will transition over time from the large MSW "megafills" of today, taking thousands and sometimes tens of thousands of tons of MSW per day, to the small inert residuals "repositories" of tomorrow.

As much as AB 939 did to launch the recycling programs we enjoy now, a new blueprint is needed to launch us on our way to the ultimate platform - "zero waste" as defined by the California Integrated Waste Management Board (CIWMB).

Several cities in the U.S., as well as some countries, have already embraced the zero waste philosophy, including San Francisco, CA; Seattle, WA; South Korea; Germany; and New Zealand - to name just a few. In addition, our own California Integrated Waste Management Board (CIWMB) has adopted a Zero Waste goal for the State of California.

A Zero Waste philosophy includes a broad array of programs and policies within an overall framework of sustainability. Some of these goals, as voiced by the CIWMB include:

- Promoting the management of all materials to their best and highest use
- Protecting public health and the environment
- Maximizing waste reduction and recycling
- Ensuring that products are made to be reused, repaired or recycled back into society
- Promoting front-end design efficiency in manufacturing to conserve virgin materials and reduce waste
- Harnessing the energy potential of waste by using new and clean technology to convert the material directly into "green" fuel, gas, or electricity

Blueprint

This plan not only puts forth the vision of where the City of Los Angeles wants to be in 2025, but provides a guiding "blueprint" of how to get there. The vision will not come to fruition overnight, but will take years of work in a gradual, yet aggressive transition.

The blueprint highlights milestones, facility development, and key actions to be accomplished during four 5-year time periods: 2005-2010, 2010-2015, 2015-2020, and 2020-2025. Actions will be required in: technology and programs, policy, and education.

Building Consensus

Another goal of this plan is to provide a focal point for the discussion that will lead to the building of a consensus and the political and public will to achieve Zero Waste.

In building consensus, it is important that all parties be heard, that all opinions, for and against, be included and valued in the dialogue. Without a doubt, the plan will change over time and with ensuing discussions – and it should! We live in a dynamic world and the handling of our resources must also change for the better to a condition of sustainability, or we face a bleak future.

With education comes knowledge, with knowledge comes consensus, with consensus comes action, and with action comes the fundamental change we need to preserve our living planet and create a sustainable future for generations to come.

HISTORICAL PERSPECTIVE

The City of Los Angeles through its Bureau of Sanitation in the Department of Public Works has provided solid resources management services to residential households since 1890. That was the year the first solid waste crematory (incinerator) was constructed providing a city owned and operated disposal service. In 1943, residential waste collection was also turned over to City forces.

Through the mid 1950s, the City allowed householders to burn combustible trash in backyard incinerators and to place their non-combustibles (mostly metal and glass containers) in a garbage can for collection by scavengers on flatbed trucks. Material that could not be burned or recycled was buried in one of the more than 100 small dumps around the City. At times, these dumps were also set on fire, thus achieving a form of volume reduction at the expense of air quality.

Food waste collected from restaurants and processing plants was fed to hogs at various ranches in the area. At one point in the 1940s there were over 100,000 hogs feeding on the City's waste.

From those auspicious beginnings, the City has progressed through five major programs, essentially one per decade:

- **The 1960s**:
  - Mayor Sam Yorty banned backyard incinerators, eliminated source-separation programs for residents
  - New rear-loading compaction trucks hauled trash to new "sanitary" landfills which opened in Palos Verdes and Pomona.

- **The 1970s:**
  - Birth of the environmental movement, Earth Day, the formation of the US EPA and the California Integrated Waste Management Board (CIWMB)
  - The City of Los Angeles focused primarily on sanitary landfill development, operation, and the first landfill gas recovery systems. City owned and operated landfills included: Gaffey Street (San

Pedro), Toyon Canyon I and II (Griffith Park), Branford (Sun Valley), Mission Canyon (West LA), Sheldon-Arleta (Sun Valley), Bishops Canyon (Elysian Park), and Lopez Canyon (Lake View Terrace)

- **1980s:**
  - The rapid growth of Waste-To-Energy (WTE). Over 150 plants were built in the U.S., but only two in the Los Angeles area: the Commerce plant (1,000 tons per day (TPD)); and the Southeast Resource Recovery Facility in Long Beach (2,240 TPD). Both are still operating.
  - The City of Los Angeles' own effort, the LANCER project, was ultimately abandoned due to local opposition and air quality concerns

- **1990s:**
  - The passage of the California Integrated Waste Management Act of 1989 (AB 939) created the three "R's": "Reduce, Reuse, and Recycle" and mandated a 50% diversion level from landfilling by the year 2000
  - The City of Los Angeles launched a combination of policies and programs overseen by the Bureau of Sanitation to achieve the 50% diversion level, including:
    - Residential curbside recycling
    - Greenwaste chipping, grinding and composting
    - Construction and demolition (C&D) debris recycling
    - Education and outreach programs
    - Recycled content procurement policies

In 1994, the Los Angeles City Council declared the goal of 70% diversion of municipal solid waste (MSW) from landfills by the year 2020.

- **2000s:**
  - The City achieved a 62% diversion level in 2002.
  - A new philosophy arose - ***"zero waste"***, embraced by cities and countries around the world and the CIWMB - promoting sustainability, beneficial use of natural resources, maximum recycling, renewable energy, and disposal of only stable, inert residues
  - The global expansion of conversion technologies (CT) that process through thermal or biological processes the organic matter in MSW and convert it to renewable fuels, chemicals or energy.
  - The expansion of recycling programs in the City of Los Angeles including:
    - Multi-family pilot recycling programs
    - Commercial sector pilot recycling programs
    - Rebate programs for haulers delivering material to material recovery facilities (MRFs) for sorting and recycling
    - Supermarket foodwaste recovery and composting

- Restaurant foodwaste recovery and composting pilot program
- AB 939 fees for private haulers
- Requirements for haulers of more than 1,000 tons per year to offer recycling services to their clients

Looking back, one can see a natural progression from the first sanitation services to backyard incineration, through the automation of collection and the advent of sanitary landfills, the decade of WTE ascendancy, the maximization of traditional recycling under AB 939, and on to the beginning of the age of Zero Waste. Facets of all these technologies, programs, and policies will play a role in the overall strategy for the foreseeable future.

WHERE WE ARE NOW

The City of Los Angeles has achieved a 62% diversion level. **Table 1.1** summarizes generation, diversion and disposal for the various sectors in the City in 2002.

TABLE 1.1
CITY OF LOS ANGELES

GENERATION, DIVERSION, DISPOSAL
2002

	TPD$_5$		
	Generation	**Diversion**	**Disposal**
Publicly Collected			
Single family & Small Apartments	5,965	2,465	3,500
Other City Departments	3,454	2,154	1,300
Other Government Facilities	1,054	154	900
Privately Collected			
Multi-Family	2,160	0(*)	2,160
Commercial	16,732	10,612	6,120
C&D (Construction & Demolition)	6,591	6,231	360
TOTAL	**35,956**	**21,616**	**14,340**

(*) presently, negligible recycling is occurring in this sector

Facilities and Programs

In the ***residential sector***, single family homes and all multi-family complexes with four or fewer units are serviced by the Bureau of Sanitation using a 3-can system; blue for traditional mixed recyclables, green for yard waste, and black for trash. The blue can represents about 16% of the total household generation, the green can 29%, and the black can 55% (of which over 70% is organic). Blue can material is delivered to processors for

sorting and marketing, and the green can to chipping and grinding facilities and ultimately composting. The black can material, about 3,500 TPD_5 is now disposed primarily at the Sunshine Canyon landfill under contract with BFI. It is hauled either directly or through transfer stations, primarily the City's Central LA Recycling & Transfer Station (CLARTS).

Larger multi-family complexes, representing roughly 600,000 units, are served by private haulers and currently have limited or no recycling opportunity. This material is hauled directly to area landfills or to transfer stations. The Bureau of Sanitation is currently funding a two-year pilot program of various recycling and MRF processing options for this sector, with the hopes of expanding it City-wide over the next few years. This material, estimated at over 2,100 TPD_5, represents a key target for future diversion programs and facilities as discussed in Chapter 5. Of this 2,100 TPD_5, over 70% is organic in nature and therefore appropriate for conversion to clean, renewable fuels, chemicals, electricity and compost. In addition, processing prior to the CT could capture more traditional recyclable material still in the wastestream.

The ***commercial sector*** is served solely by 140 private haulers, with the exception of City and other government facilities that are collected by the Bureau of Sanitation. Combined, these wastestreams represented over 8,000 TPD_5 going to disposal in 2002, and along with the multi-family sector, the key target for future diversion programs and facilities. Of this 8,000 TPD_5, roughly 70-75% is organic in nature and therefore appropriate for conversion to fuels, chemicals and electricity or compost as discussed in Chapter 5. At present, this material is going to landfills throughout the basin, except those operated by the Los Angeles County Sanitation Districts, either by direct haul or through transfer stations.

To the credit of the private sector, AB939 reporting shows that in 2002 they diverted nearly 11,000 TPD_5 from the commercial wastestream. This represents half the diversion in the City. Clearly, there are already many successful reduction, reuse, and recycling programs running at commercial and manufacturing facilities throughout the City, and there are financial incentives for businesses to participate.

The Bureau of Sanitation is currently funding a two year pilot program of MRF processing for this sector, to determine what diversion level can be achieved from sorting general commercial waste with no source-separation, and with no changes at all to existing waste storage or collection systems. If results prove encouraging, the Bureau of Sanitation looks to expand the program over the next few years.

The Bureau is also conducting an incentive program using money from the 10% gross receipts franchise fee on all licensed haulers in the City. Mixed commercial loads delivered to a City-certified MRF receive a $25/ton rebate for each ton of MSW recycled.

Although the **Construction and Demolition** debris (C&D) wastestream is large in the City of Los Angeles at over 6,500 TPD_5, as shown previously in **Table 1.1**, the vast majority of this material is being recycled according to Bureau of Sanitation reports.

Clearly, there is much source-separation and recovery of material at the job sites, and mixed material is finding its way to processing facilities where recyclables are recovered.

Of all the wastestreams, this is the easiest one in which to achieve high diversion levels because it is mostly bulky, recyclable (wood, metal, inert debris, greenwaste, etc.), and heavy. In the last year or so, additional processors have come on line (see **Appendix K**), so that the capacity exists to process and recycle even more.

Even with the high level of diversion, the City is pressing ahead with an ordinance to further support recycling in this sector (See **Appendix H**). Also, the Bureau of Sanitation is conducting an incentive program using money from the 10% gross receipts franchise fee on all licensed haulers in the City. Mixed C&D loads delivered to a City-certified processor receive a $10/ton rebate for each ton recycled.

This wastestream will require the least effort in the future, because the systems and facilities are largely in place for its diversion. Note however, that wood treated with preservatives cannot be recycled at C&D facilities, but could be converted to energy at certain CT facilities.

Education and Public Outreach

Education and public outreach are primarily the responsibility of the Bureau of Sanitation. Admittedly, in recent years the funding for such programs has been extremely limited. As a result, public outreach and education in relation to the residential curbside recycling program has been virtually non-existent, contributing in part to a contamination rate in the blue barrel material of over 30% (contamination includes non-recyclables such as food waste, wood, clothing, etc.). With the advent of the 10% franchise fee on haulers, more money may be available in the future for education.

At present, the BOS is participating in the following programs:

- Advertising on the sides of City collection trucks
- Billboard advertising
- Free composting workshops at the Griffith Park Composting Facility
- A monthly newsletter, *An Environmental Affair*, produced by the Environmental Affairs Department
- Free mulch program
- Garden for Kids LA: City of Los Angeles initiative designed to bring gardens to schools throughout the City.

In addition to the City of Los Angeles, the County of Los Angeles and the CIWMB sponsor education and outreach programs, which can be summarized as follows:

- School curriculums (K-12): Environmental Ambassador pilot program, Generation Earth, LA County Sanitation Districts Education program, Think Earth Environmental Education, and the United Education Strategy Grant program
- Defenders of the Earth (assembly performances by costumed characters)

- Smart gardening workshops: residents can learn about composting
- Community recycling events: waste tires, e-waste, household hazardous waste

Recycling Market Development Zone (RMDZ) Program

One of the critical aspects of the recycling system is the re-manufacturing of recycled material into new products and the sale of these products back into the community - so called, "closing the loop". In support of this, the CIWMB initiated a program several years ago to establish RMDZs throughout the State in which new industries could locate and receive economic incentives. By re-manufacturing recyclable material, these companies provide jobs, stimulate the local economy, stabilize markets, and support existing recycling efforts. The entire City of Los Angeles has been designated an RMDZ.

At present, there is no master list of recycling industries (companies making products out of recyclable material). However, a 2002 report by the Los Angeles Bureau of Sanitation showed that Los Angeles hosts more than 600 recycling and reuse companies that employ nearly 8,000 people[4].

The nurturing and support of such a local manufacturing sector is key to the concept of Zero Waste and represents the "new industrial revolution". This is especially true when such manufacturing is done in an environmentally and humanly conscious way, preserving virgin resources, maximizing recycling, minimizing toxic waste and hazardous emissions, and nurturing ecosystems.

WHERE WE NEED TO GO

What would be the qualities, the new "goals", of a paradigm of Zero Waste and the creation of a new home-grown industry? Some of the most important elements are:

- *Sustainability*
- *Responsibility*
- *Protection of the environment*
- *Conservation of Resources*
- *Renewability*
- *Economic Stewardship*
- *Fairness*
- *Leadership*
- *Vision*
- *Education and Outreach*

Over the past 15 years, the City of Los Angeles has made significant and accomplished strides both in the public and private sector toward a Zero Waste system, even though it wasn't officially labeled as such. Most notably, as a whole the City has achieved a diversion rate of 62% and is pressing ahead to reach the self-imposed mandate of 70% by the prescribed 2020.

The Bureau of Sanitation's "Phase IV Report – Solid Waste Management Policy Plan" of October 1993 laid out the beginnings of the vision discussed here. This Plan was updated in 2000 with a Solid Resources Infrastructure Strategy Facilities Plan and again in 2001 with Strategic Recommendations for Meeting the Year 2020 70% Diversion Goal. Now it is time to carry on from there with renewed understanding, commitment and urgency.

In the private sector, companies continue to develop new MRFs, C&D processing facilities, composting sites and other facilities in spite of the difficulty in permitting such projects in an area booming with development and residential communities.

Conversion Technologies form a nexus between the solid waste industry and the power industry in that they "convert" portions of our wastestreams into renewable energy - thus simultaneously achieving waste diversion and green energy. In the City of Los Angeles, this creates a connection with the Department of Water and Power (DWP) and its aggressive Renewable Portfolio Standard (RPS) calling for 13% renewable energy by 2010 and 20% by 2017.

The RENEW LA plan, supported by public policy and a series of incentives and penalties, achieves the following:

- Enhanced and continual growth of existing diversion programs in the residential, commercial and C&D sectors.
- Establishment of a system of CT facilities to process the remaining residual material still going to landfill disposal, and achieving significant additional diversion whether in the form of traditional recyclables, compost, fuels, chemicals or energy.
- Facilitation of a smooth transition over the next 20 years from the existing system based primarily on truck transfer and haul to landfill, to increased MRF processing and material recovery, to interim system components of long haul by truck or rail to remote disposal sites, and finally to the ultimate system based on CT.

The measurable goal to be achieved by this blueprint for resource management is a true 90% diversion rate or greater, reflected in the following goals for disposal tonnage (See Chapter 5 for details):

Year	Total Tonnage Generated (TPD)	Tonnage to Disposal (TPD)
2005	38,000	14,000 (current number)
2010	42,000	13,000
2015	46,000	10,000
2020	51,000	7,000
2025	56,000	4,000 (inert residual)

It is important to note that this diversion includes not only the existing material going to disposal, but a 2% growth per year which adds thousands of tons per day in the long term that must also be diverted. For example, the 4,000 TPD_5 going to disposal in 2025 is out of a total estimated generation of 56,000 TPD_5 for the City of Los Angeles.

GETTING THERE (the Blueprint)

The Technology

This blueprint relies on two key elements:

- the continuation, enhancement and growth of existing diversion programs; and
- the development of new CT facilities to process residual material still going to disposal (all CTs are non-combustion).

This plan makes no recommendations regarding the types of CT to be developed, but does highlight the five basic ones currently being evaluated and developed in Los Angeles and already in use in other cities and countries around the world. The CTs are:

- Gasification and Pyrolysis
- Anaerobic Digestion
- MSW Composting
- Autoclaving
- Fermentation

Some photographs of plants in Europe, as well as one major recycling plant here in California, are shown on the following pages.

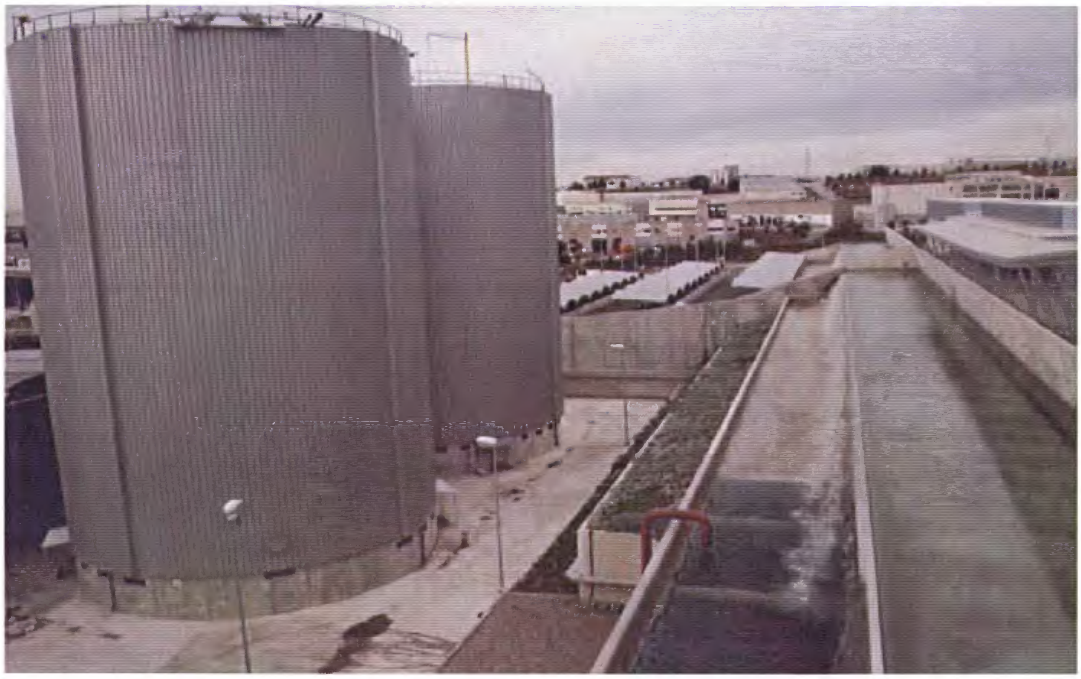
Gasification and Pyrolysis

This technology involves the thermal conversion of biomass including: greenwaste, paper, cardboard, wood, food waste, and others to syngas with a high percentage of methane, a small volume of inert ash, and water. The product gas is used to generate steam or electricity.

Pyrolysis utilizes heat in the absence of oxygen to obtain thermal conversion, while gasification systems employ low levels of oxygen (short of that needed for combustion) to achieve the same ends.

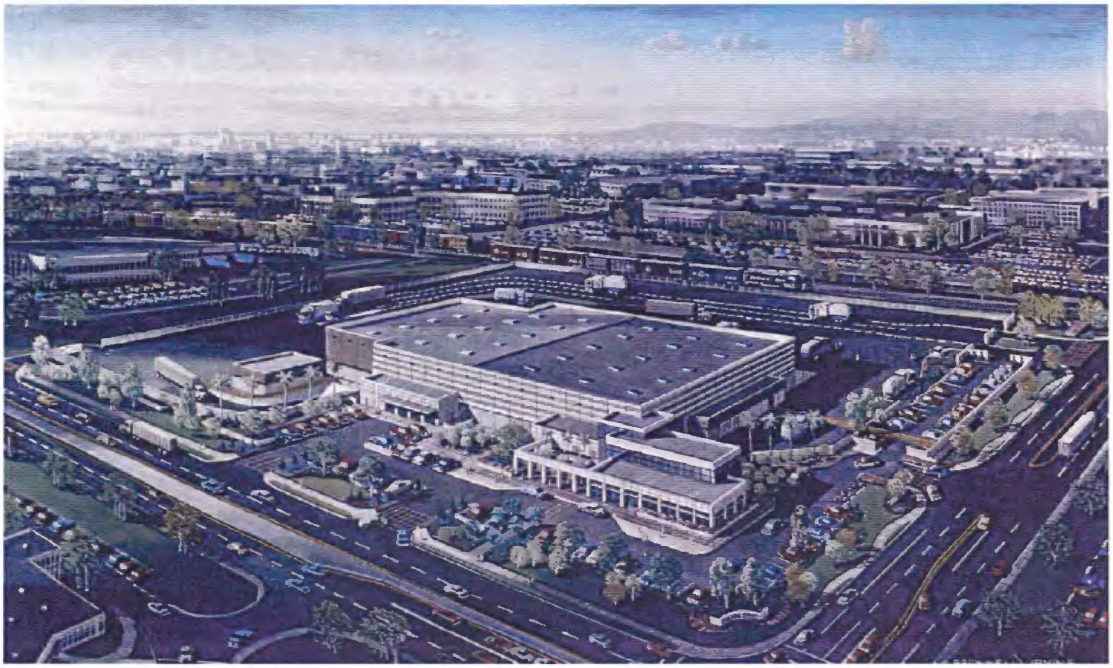
There are approximately 50 companies worldwide marketing gasification and pyrolysis technology. The greatest concentration of such plants in the world is in Japan where lack of landfill space and high disposal costs have driven them to seek more advanced solutions. According to CIWMB studies, over 50 plants in Japan have installed capacity of over 2.5 million tons per year (TPY)[26], equivalent to roughly 100% of the biomass going to landfill from the City of Los Angeles.

ANAEROBIC DIGESTION PLANTS (BELGIUM)



ANAEROBIC DIGESTION PLANT
(SPAIN)

GASIFICATION PLANTS (GERMANY)



MRF/TRANSFER STATION
(OXNARD, CA)

At present, there are no "gasification" systems in the U.S. processing MSW. The focus to date in the U.S. has been on the conversion of select streams of material such as wood waste, chipped tires, or coal; however, there are several companies that include MSW as a target feedstock.

Gasification or pyrolysis generates low air emissions, and achieves high rates of conversion leaving a bottom ash residue of only 10-15% by weight of the incoming material. The process generally requires a Refuse-Derived-Fuel (RDF) feedstock processed from mixed MSW, and a landfill for disposal of ash. The ash can also be recycled as a product in concrete products. The latest pyrolysis technologies can further recover recyclable metal and glass at the back end of the system.

Results of data gathering as part of the recent CIWMB Conversion Technology Report to the Legislature (March 2005) showed that the current gasification or pyrolysis plants in Japan and Europe are fully capable of meeting the strict air emission standards that a plant in Los Angeles would be required to meet.

Anaerobic Digestion

Anaerobic Digestion is one of the fastest growing CTs in the world. The greatest concentration of facilities is in Western Europe where a combination of market drivers is stimulating development of new plants in Belgium, Germany, Holland, Spain, Italy, France and other locations. Today, over 80 plants represent installed capacity of 2.8 million TPY[26], equivalent to over 100% of the total biomass going to landfill from the City of Los Angeles.

Anaerobic Digestion is the bacterial breakdown of organic material in the absence of oxygen. The process produces methane gas, which can be used for heat and/or power generation, and a solid residual that is typically composted into a soil amendment which can increase water retention and increase crop yields.

Anaerobic Digestion is also being used extensively in the dairy industry to process cow manure and generate electricity for farms. Although small in size, the number and success of these projects is noteworthy and proves performance and cost effectiveness, at least in that agricultural arena. With a substantial horse population in the San Fernando Valley, this use has potential in Los Angeles.

The application of most importance for this plan is the digestion of the organic fraction of MSW. There are scores of such plants operating throughout Europe, but only one in N. America, a demonstration plant in Toronto.

MSW Composting

The third promising CT is the most proven in the U.S., namely the in-vessel composting of MSW for production of compost. The technology features controlled oxygen, moisture, and temperature environments to accelerate the decomposition of

organics. Each in-vessel stage is generally followed by curing in an aerated-static pile or traditional windrow. There are four firms currently pursuing projects in the U.S. and several full-scale plants in operation.

Each of these companies use variations on the actual vessel used, ranging from buildings to long ten or twelve foot diameter rotating tubes. The idea however is the same, to provide a controlled environment to facilitate decomposition.

The outstanding questions regarding MSW composting are the quality and marketability of the final product, the cost of residue disposal, and the value and marketability of the final product. There has historically been a negative perception about the quality of the finished compost and a general reluctance in the market place to purchase it. This has often resulted in the project having to pay to get rid of the material.

On the positive side, these technologies often work best as "co-composting" facilities meaning they process both MSW and biosolids together. This improves economics and the quality of the final product, although project permitting and development becomes more complicated.

Autoclaving

Autoclaving of medical waste for sterilization before disposal has long been practiced throughout the U.S. However, this plan reflects a much broader, larger, and innovative process in which mixed residential and commercial MSW or post-MRF residue is "pressure cooked" with steam in large, rotating super drums up to 25-ft in diameter and 100 ft long. This facilitates subsequent separation of organic material (paper, cardboard, foodwaste, etc.) from inorganic (glass, metal, plastic, textiles, etc.).

The process involves the following steps:

- Autoclaving of "as received" or "post MRF" MSW (no shredding or pre-processing is necessary except removal of bulky items)
- Screening
- Sorting of traditional recyclables
- Paper fiber cleaning
- Anaerobic digestion (optional)
- Power generation (optional)
- Wastewater treatment and discharge to sewer

Autoclaving can be viewed as a "pre-processing" step for other CT applications or as a CT process in its own right. Overall diversion of 70-90% can be achieved depending on the quality of the MSW feedstock. The ability of this technology to produce a high-quality organic feedstock for CT plants is important. In fact, some of the greatest challenges facing these technologies are in feedstock preparation.

The first commercial autoclave system in the U.S. has been constructed and is in the start-up phase in Minneapolis, MN. The plant will utilize two 8-ft diameter autoclaves to

process up to 300 TPD of MSW into refuse derived fuel (RDF) for a nearby Waste-To-Energy (WTE) plant.

The second commercial plant is in construction at the CVT transfer station in Anaheim, CA. This plant features two autoclaves that will process up to 500 TPD of mixed commercial and "post MRF" residue that is now landfilled. The recovered fiber will be dewatered to "wet lap" quality and sold to a local paper mill for manufacturing into new corrugated medium. This facility is due to start operations in late 2005.

Fermentation

Fermentation is the breakdown of the organic fraction of MSW (paper, food waste, greenwaste) to sugar (glucose), followed by the fermentation and distillation of the glucose to bio-fuels or bio-chemicals. The two dominant products are ethanol (clean burning fuel and gasoline additive), and acetic acid, although a wide range of end product chemicals are possible, including hydrogen for fuel cell cars. One major benefit of this technology is the strength of the product markets, which are global in nature and non-traditional for MSW-derived materials.

In California, ethanol is now being used as a replacement for MTBE (gasoline oxygenate). This has created a huge demand for ethanol in the State (700 million gallons per year), which is currently being met by shipments of corn ethanol from the Midwest.

Based on current work by URS Consultants for the City of Los Angeles, fermentation technology is not as advanced in a commercial sense as are either gasification or anaerobic digestion. In fact, there are no commercial cellulosic ethanol plants in the world at present. However, in five to 10 years, it is quite likely that this technology will be commercialized and important given the lure of an almost unlimited ethanol market. Thus the R&D work and the drive to develop a first project continues with some urgency.

From an environmental perspective, these plants are seen as low impact projects with most of the processes occurring in fully enclosed tanks and under low temperature, biological conditions. This is particularly true of the enzymatic hydrolysis process which is all biological. However, even in the acid hydrolysis process, the acid will be recaptured and the by-products (such as lignin) made into saleable commodities.

The System

Existing programs and facilities in the City of Los Angeles, combined with new CT plants, will create a system that can approach a zero waste goal. Flow diagrams of each of the three sectors (residential, commercial and construction and demolition debris) that make up the City of Los Angeles' disposal stream are illustrated on the following pages. In each, a concept level mass balance illustrates how 100 tons of MSW could be reduced to 10 tons or less at the disposal site - thus demonstrating a 90^{+}% diversion level.

Due to variations in technologies and output products, tonnages are not shown exiting the CT facilities. For example, fermentation produces primarily ethanol for fuel, gasification primarily electricity, and anaerobic digestion a combination of electricity and compost. **Figures 5.6** through **5.8** in Section 5 provide more detail in this regard.

Figure 1.1 shows the ultimate resource management system for the **residential sector** including single family, multi-family, and self haul. As can be seen, most of the infrastructure is existing, but the new pieces (MRF/autoclave and CT) play a key role. In this model, roughly 60% of the wastestream would be pre-processed and a little more than 40% would be sent as feedstock to a CT plant to be recovered for beneficial use.

The 3-can single family home system would continue with the possible addition of foodwaste to the green can. The big change is the recovery of most of the black can material through pre-processing and the CT plant. This material currently goes directly to disposal.

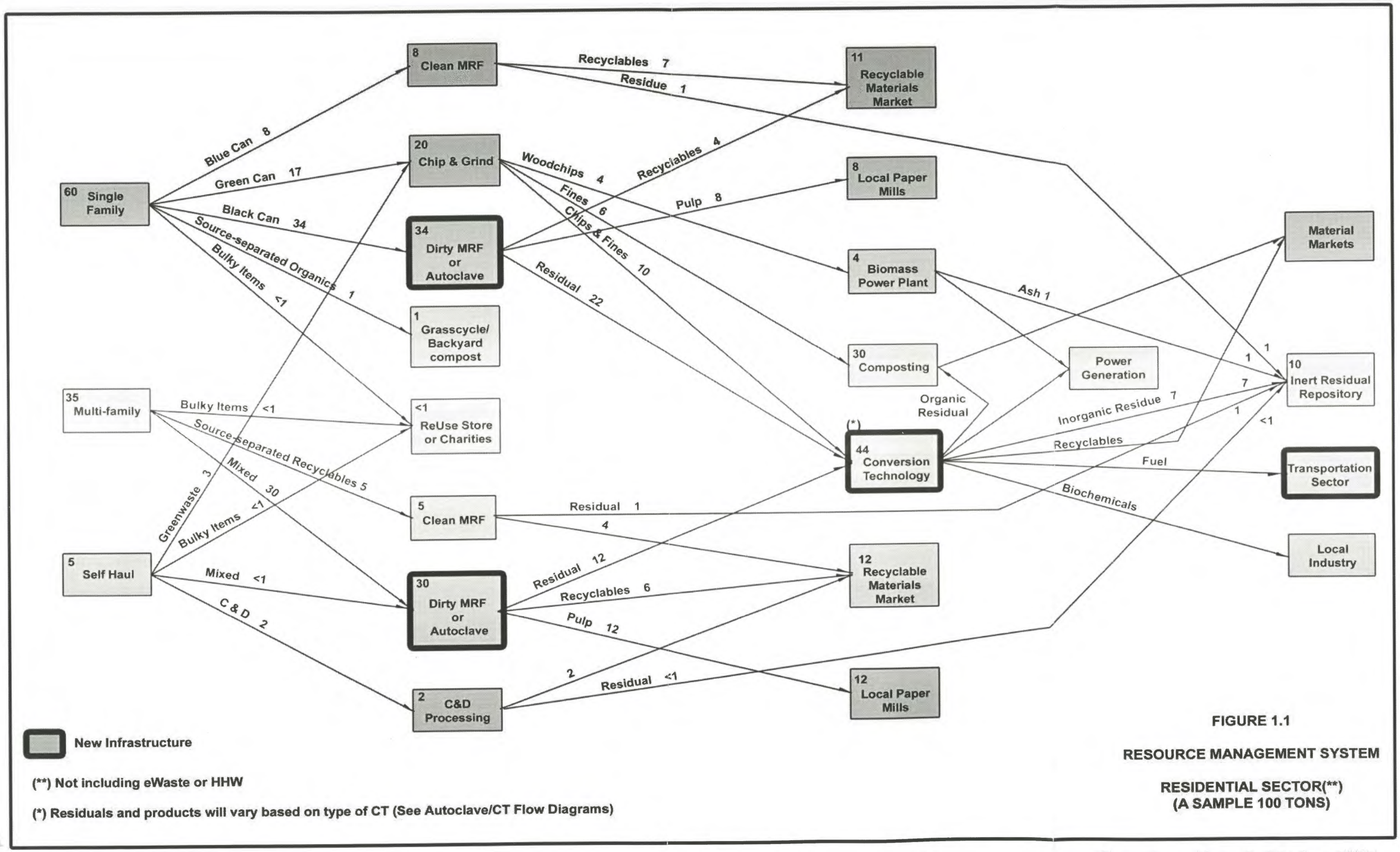
Multi-family material is assumed to be recovered by some type of source-separation program or processed as mixed waste and use as feedstock for a CT plant. Self-haul would be forced out of the landfills and into one of the processing facilities depending on the type of material. The latter would require an expanded program of public education and enforcement to discourage illegal dumping.

As shown on the figure, end uses of the recovered resources include: traditional recyclables markets, reuse stores, paper mills, biomass power plants, composting sites, the electrical grid, transportation fueling facilities, or local industry.

Figure 1.2 shows the ultimate resource management system for the **commercial sector** including government facilities, commerce, manufacturing, restaurants, bars and hospitality, and supermarkets. Again, a sample 100-ton mass balance shows how a 90% diversion level could be achieved by the addition of a high level of mixed waste pre-processing (75%) followed by CT for nearly half the wastestream.

Assumptions here are that the supermarket produce collection program will continue to grow, as will the nascent restaurant foodwaste recycling program (currently targeting 150 restaurants in a pilot program). However, these programs represent only a small fraction of the total wastestream.

The vast majority of commercial waste will be handled in three ways in the future. First, source-separation of about 10% of the material is assumed, primarily cardboard and paper. Second, diversion can be improved significantly by establishing a "wet/dry" collection system in which trucks are re-routed to collect accounts with either wetter material containing foodwaste, or drier material of mostly paper and cardboard. In this way, the wetter material can be directed to CT facilities, such as anaerobic digestion, while the drier loads can be more easily MRF'd with improved recovery in the 30-50% range, and a reduction in contamination. This may require incentives to haulers, particularly in the early years, to reward them for establishing new routing systems and



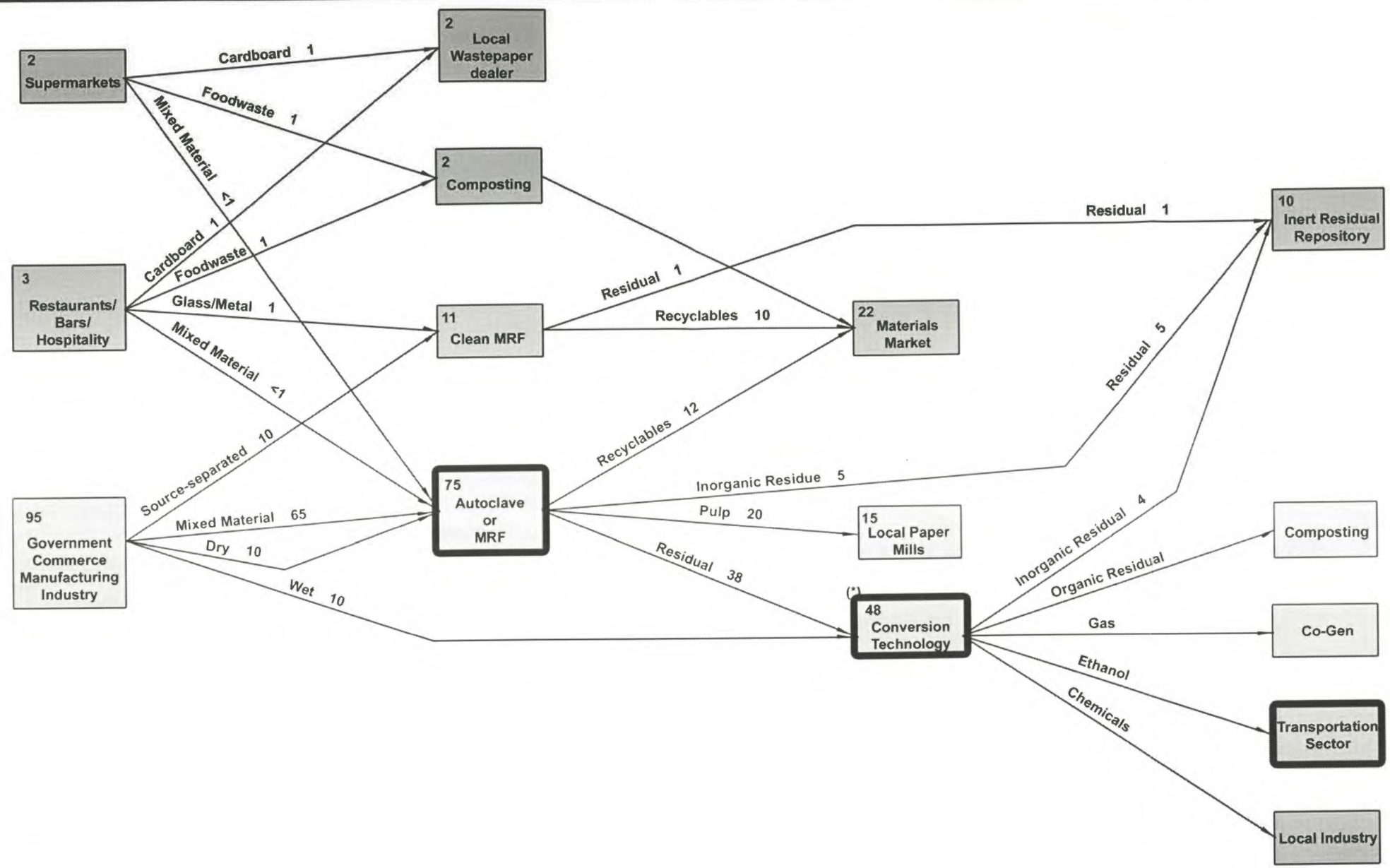
(**) Not including eWaste or HHW

(*) Residuals and products will vary based on type of CT (See Autoclave/CT Flow Diagrams)

FIGURE 1.1

RESOURCE MANAGEMENT SYSTEM

RESIDENTIAL SECTOR(**)
(A SAMPLE 100 TONS)



(*) Residuals and products will vary based on type of CT (See Autoclave/CT Flow Diagrams)

FIGURE 1.2

RESOURCE MANAGEMENT SYSTEM

COMMERCIAL SECTOR
(A SAMPLE 100 TONS)

diverting their collection trucks from landfills to MRFs. However, some haulers are already running wet/dry routes to some extent and processing the dry route material at MRFs; therefore the incentive may not have to be too great. In addition, the City could work with the CIWMB to mandate processing of all MSW prior to disposal on a Statewide basis.

Construction & Demolition Sector

Even with the huge construction, demolition, and remodel industry in Los Angeles, Bureau of Sanitation records indicate that C&D debris comprises a relatively small amount of the material being landfilled at present. This is likely due to the fact that much of this material is already being source-separated at the construction sites and recycled, or delivered mixed to C&D processing facilities.

The ultimate blueprint for the construction & demolition sector shown on **Figure 1.3** calls for intensified deconstruction and reuse of construction materials, source separation for recycling at the job site, and sorting and recovery of mixed materials at C&D processing facilities. Although much of this infrastructure is already in place in Los Angeles, the new CT facilities (primarily processing of wood waste) could play a supporting role.

The Numbers

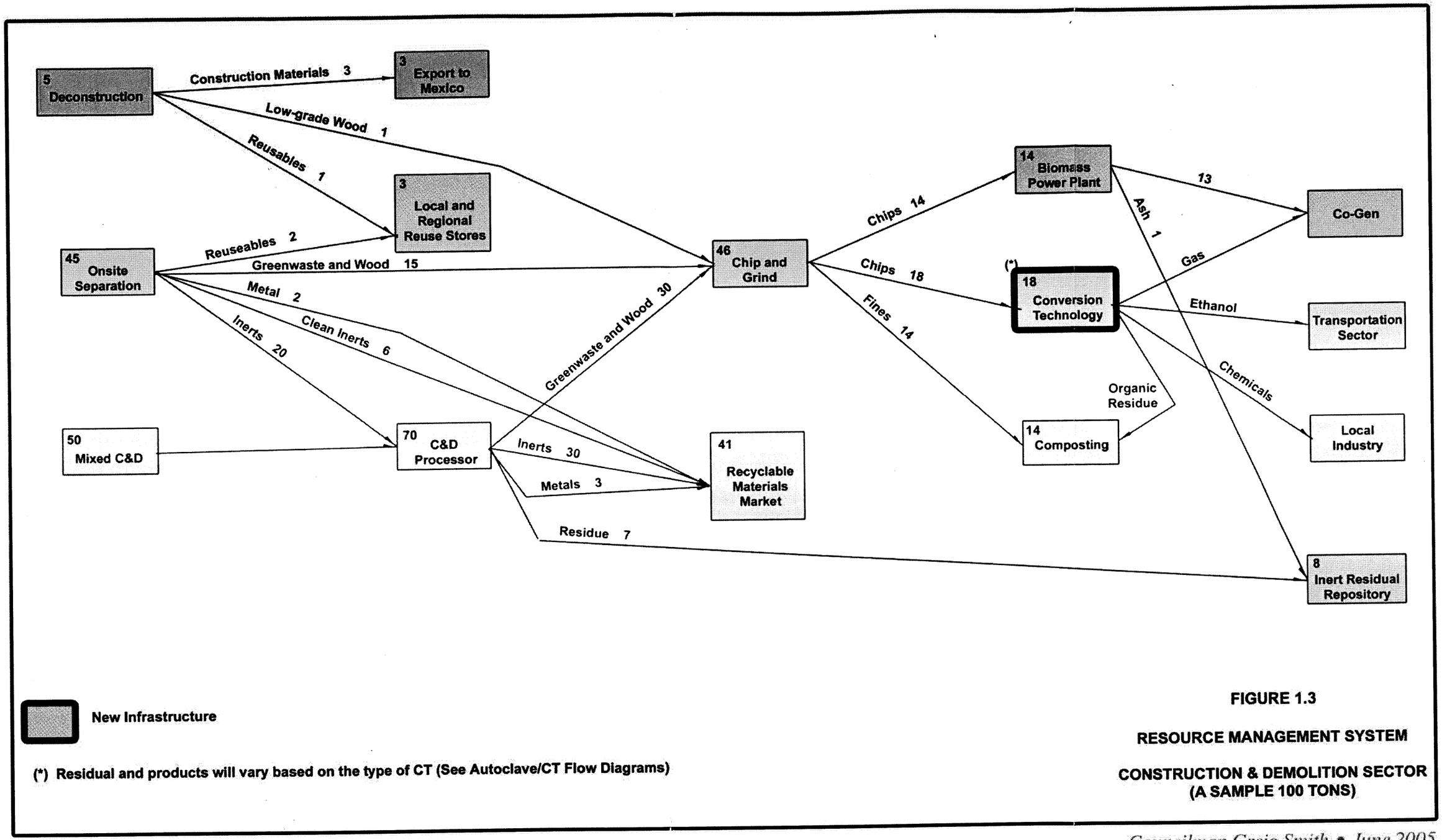
Table 1.2 reflects the application of the programs and infrastructure shown in the diagrams to the actual wastestreams in the City of Los Angeles. The major target wastestreams are the multi-family and commercial sectors.

As shown, it is possible to hit a 90% or greater diversion level by 2025, even with a massive growth in generation from 38,000 TPD today, to 56,000 in 2025. To get there, we need to put in place the programs and facilities to achieve new diversion, beyond that already occurring, of over 17,000 TPD. Most of this will come from CT facilities.

The New CT Facilities

Table 1.3 on page 1-25 summarizes the new CT facilities and their expansions that will be required during each of the five-year planning periods. As shown, the City will need to launch a major development program over the next 20 years in partnership with the private sector for the siting, permitting, design, construction and operation of seven CT facilities. Plants will range from 1,250 to 3,000 TPD and most will be developed in stages, starting with smaller capacities and building from there. CT is generally modular in concept, so expansion is relatively simple.

Seven plants are planned not only to meet the diversion requirement, but also so that each of the six refuse collection districts of the City could host one, with the seventh location flexible based on opportunity. This was done as part of the environmental justice program in which every area of the City participates by hosting facilities and



(*) Residual and products will vary based on the type of CT (See Autoclave/CT Flow Diagrams)

FIGURE 1.3

RESOURCE MANAGEMENT SYSTEM

CONSTRUCTION & DEMOLITION SECTOR (A SAMPLE 100 TONS)

NEWLA

TABLE 1.2
RESOURCE MANAGEMENT PLAN
ZERO WASTE TARGET 2025

	(TPD) (***)				
Year	**Citywide Generation(*)**	**Existing Diversion Programs(**)**	**Total New Diversion**	**Final Disposal Tonnage**	**Overall Diversion (%)**
2005	37,959	23,673	0	14,286	**62**
2010	41,910	26,137	2,365	13,408	**68**
2015	46,272	28,857	6,955	10,460	**77**
2020	51,088	31,861	12,675	6,552	**87**
2025	56,405	35,177	17,085	4,143	**93**

(*) Assumes 2% growth in each sector per year due to population and commerce increase
Year 2005 based on actual tonnages reported by Bureau of Sanitation for 2002 then extrapolated at 2% per year to 2025
(**) Assumes 2% growth in existing programs per year
(***) Assumes 5 days per week
Existing programs
With RENEW LA programs

programs, and also because it reduces trucking and its attendant air emissions and traffic congestion. Admittedly, however, the public acceptance issues are serious and will require very close coordination with Neighborhood Councils, the Council offices themselves, and key stakeholders.

Because the City controls only a portion of Citywide collection (collecting less than one-third of the total City tonnage and only in the residential and institutional sectors), it will be necessary for the City to form partnerships with the private sector for CT facility development for the multi-family and commercial wastestreams. These partnerships could take several forms, with the City possibly contributing:

- Land
- Permitting support
- Assistance in public education and outreach with the communities through the Neighborhood Councils
- Financing through the California Pollution Control Authority (CPCFA)
- Guaranteed tonnage from the City-collected wastestreams
- Direct contributions to capital costs and incentives
- Enhanced energy payments through the DWP's RPS program

TABLE 1.3
STRATEGIC PLAN
FACILITY DEVELOPMENT SUMMARY
(Initial Plant Construction and Expansions)

CT Plant	Plant Capacity Constructed During Period (TPD)				Total Plant Capacity 2025
	2005-2010	2010-2015	2015-2020	2020-2025	
Plant 1	***500***	750			**1,250**
Plant 2	***500***	750		750	**2,000**
Plant 3		***750***	1,500		**2,250**
Plant 4		***750***	1,500	750	**3,000**
Plant 5			***1,500***		**1,500**
Plant 6			***1,500***	1,500	**3,000**
Plant 7				***1,500***	**1,500**
TOTAL CAPACITY					**14,500**

Indicates initial plant construction
Other boxes indicate plant expansions

The private sector could contribute:

- The technology itself and know-how to develop and operate a plant
- Long term throughput, performance and tipping fee guarantees
- Construction and equipment installation
- Revenue sharing on recyclables, compost, fuels, chemicals, and energy sales
- Marketing of products
- Monitoring and reporting

Note that each CT plant and each expansion requires a similar expansion of pre-processing capacity - either a traditional MRF, autoclave, or expansion of the CT's own front end system. It would improve economics, siting, and truck traffic if these facilities are "co-located" adjacent to each other. However, this does not *need* to be the case. Prepared feedstocks from the MRF or autoclave could be trucked to separate CT plants.

Another challenge will be the processing of mixed commercial and multi-family material at traditional MRFs for recovery of recyclables and preparation of feedstock for

following facilies. By 2015, we will need over 8,000 TPD of capacity. It is assumed here that existing plants could handle this, perhaps with expansions of capacity and processing capability. However, if this proves to not be the case, then one or more major MRFs would also need to be developed.

Facility Siting and Permitting

It is beyond the scope of this plan to perform an in depth facility siting analysis. However, it is a crucial aspect of this blueprint, as the successful siting, permitting, and development of the seven CT facilities forms the foundation of the new system.

CT projects will be sited in industrial zones of the City. There is little heavy industrial zoning outside of four areas: the harbor, LAX, south central LA, and Sun Valley. In fact, industrially zoned land of any type is at a premium. One recommendation of this plan is to modify the City Zoning Code to allow CT development by right in the M-2 and M-3 Zones, with conditions.

The key to successful siting and project development is to involve the community early and often in the process. This can be achieved through the host City Council office and also through the Neighborhood Councils and their committees. It is imperative, and mandated by the public hearings called for in the permitting process, to have an open and honest discussion with the local community about the project, its importance in the larger scheme of things, its design, operation, potential impacts (both positive and negative), and regulatory controls. The Neighborhood Councils are a good forum for this discussion. Some projects have found it helpful to develop a community working group to meet on an ongoing basis with project developers and provide key input on elements important to the community as a whole.

Conversion Technologies are very low in environmental impacts and a positive factor regarding local jobs, renewable energy and other community benefits. The goal of public outreach is to drive home these values, to quickly eliminate any false rumors or information, and to build trust between the City, its project partners, and the people who live in the area. This can go a long way toward minimizing local concerns. This is particularly crucial with new CT that will be a mystery to most residents and may conjure up images of environmental problems - when just the opposite is true.

Issues of highest importance to convey clearly to the community are:

- Truck traffic, its circulation patterns, impacts, and mitigation measures
- Aesthetics (architectural design, landscaping, etc.)
- Nuisance mitigation (control of dust, odor, noise)
- Air emission control technologies
- Stormwater control and reuse
- Other health and safety issues
- Creation of jobs during construction and operations
- Sustainability benefits

Recent experience on other projects in the Sun Valley region of the City has shown that new projects, be they MRFs, C&D processors or CT facilities must strive for a higher level of community involvement, service, and environmental controls such as:

- Attractive architecture with community input on design and color, and incorporating "green" building elements
- Fully-enclosed buildings with state-of-the-art misting systems, negative pressure air flow, and perhaps biofilters for dust and odor control
- Extensive landscaping (preferably drought tolerant)
- Innovative stormwater treatment and recharge in conjunction with Proposition O efforts
- Onsite generation of electricity for plant operations (via the CT process itself, or additional solar)
- Participation in ongoing community charity events, schools and parks, etc. – including possible payments into community betterment funds.

Another possibility is the siting of a joint use facility in an industrial area of an adjoining city. Twenty-five cities touch the boundary of the City of Los Angeles and any one or more of them could form a Joint Powers Authority (JPA) with the City of Los Angeles for developing a project that could serve several jurisdictions. Likewise, there are 14 County Unincorporated areas that adjoin the City that could also participate or host a facility.

Transition over the Next 20 Years

As can be seen in the previous tables and figures, the paradigm shift to resource management and the drive toward Zero Waste will take a major commitment of time, effort, and money to develop the needed facilities and programs over the next 20 years. During this period, there will be a gradual transition through six basic management systems - from the more simple to the more complex; from a disposal basis to a recovery basis; from what's perceived as the "cheapest" system to the best system.

The six interrelated systems are as follows (the italicized portions are those added or modified from the previous scenario):

- Scenario 1: Local Landfills
- Scenario 2: ***Transfer and Haul*** *to* Local Landfills
- Scenario 3: ***MRF***/Transfer and Haul to Local Landfills
- Scenario 4: MRF/Transfer and ***Long-Haul to Distant Regional Landfills***
- Scenario 5: MRF/Transfer and ***Rail-Haul to Remote Desert Landfills***
- Scenario 6: MRF/Transfer, ***Convert and Haul to Local Inert Repositories***

During the transition, several of these, and perhaps all six, will be in operation simultaneously as local landfills close, disposal fees rise, new recycled product markets continue to develop, rail haul is inaugurated by the LACSD in late 2009, and other market forces and public policies come into play.

The Policies

This blueprint makes the conscious choice to take the "high ground", to do the right thing on a long-term, overarching cost/benefit basis that takes into account societal and environmental concerns. Much as we did in 1989 with the creation of AB939, we are now establishing a new paradigm for the City of Los Angeles, this time with a Zero Waste target.

The City of Los Angeles is unique in that it controls little of the infrastructure that it depends on for the handling of MSW. City forces collect about one-third of all City-generated waste by servicing single family homes and small multi-family units, but the private sector collects the lion's share of City-generated MSW in the multi-family (complexes larger than four units), commercial and C&D sectors.

Likewise, the City controls none of the landfills receiving City-generated waste, and only one of the MRF/transfer stations (CLARTS) that it purchased in 2004. Unlike Orange County that owns and operates all the landfills in their county, or the City of San Francisco with the luxury of having only one franchise hauler that they have considerable control over, the City of Los Angeles must work with many companies in the private sector on both collection, diversion and disposal.

To facilitate the transition from a disposal to a recovery based system, it will be necessary for the City to adopt policies that will either "incentivize" diversion activities, "penalize" disposal, or both. Given the lack of control over landfills and the dominance of "open market" private sector collection in Los Angeles, the policies that could be most feasible and effective in supporting the programs and infrastructure called for in this blueprint are listed below.

Zero Waste

- Adopt this Blueprint as the guiding plan for the City for the next 20 years.
- Adopt a Zero Waste policy

Blueprint Oversight

- Establish a permanent "RENEW LA" committee responsible for overseeing the blueprint, making needed adjustments and reporting directly to the City Council.
- Instruct the City Department of Environmental Affairs, with support from the B.O.S. and C.A.O. (with the assistance of a consultant, if necessary), to carry on the work started in this RENEW LA plan to research and develop a comprehensive cost/benefit analysis of the six waste management systems (listed on the previous page). This would include not only the engineering

aspects but also health impacts, environmental effects, transportation issues, and economic benefits of new job creation.

Source Reduction

- Coordinate at all levels of government to establish joint initiatives with major supermarkets to reduce packaging.
- Sponsor an annual conference or workshop for local manufacturers on resource conservation, recycling, green energy and waste minimization.

California Legislature and the California Integrated Waste Management Board

- Support the CIWMB's ongoing CT research and analysis.
- Support the exclusion of CT facilities from the Solid Waste Facility Permitting Process if they utilize a pre-processed feedstock.
- Mandate that Caltrans use mulch and compost made from California curbside greenwaste material on all its freeway landscape, and other landscaped properties.
- Encourage the legislative mandate that all waste material (residential, commercial or C&D debris) must be "processed" at a MRF or CT facility prior to the residue being disposed.
- Support the phase out of greenwaste as alternate daily cover (ADC) by 2010 to stimulate the development of CT and the best and highest use of resources
- As CT is phased in, support a landfill ban of the following materials:
    - Greenwaste and tree trimmings: 2010
    - Recyclable material including: cardboard, office paper, newspaper, magazines, glass containers, marketable plastic, steel containers, aluminum containers, bi-metal cans: 2010
    - C&D debris: 2010
    - Any and all organic material: 2020
- Encourage a State Mandate for a "Zero Waste" fee on all tonnage disposed at landfills starting in 2006 at $5.00/ton and increasing $2.50/year thereafter.

Residential Sector

- Mandate reduction in City-collected MSW disposed at the Sunshine Canyon Landfill according to the following schedule:

Year	Proposed TPD
2005	3,600 (current tonnage)
2006	3,000
2007	2,000
2008	1,000
2009	500

- Purchase new, or set-aside existing, City land for community mulch and compost distribution centers (roughly 1/4 acre each).

Single Family Homes

- Contract for home composting bins made of post consumer material and distribute one to each home with instructional material free of charge; (currently bins are sold at steep discount to homeowners at periodic workshops).
- Set up a hotline and a home composting ombudsman for assisting homeowners with composting questions; also a page on the Bureau of Sanitation's website for online support.
- Institute a variable can rate on the black can with a price break to residents for use of a smaller size (i.e. 30 gallons); simultaneously, initiate an inspection and enforcement/reward program to minimize abuse of the variable can program (by throwing excess trash in the blue or green cans), and to minimize illegal dumping.
- Establish an enforcement program whereby drivers (or other inspectors) randomly inspect blue cans prior to collection, tag those with contamination, issue warnings, or refuse to collect the blue can. Multiple offenses could result in removal of the blue can altogether.
- Modify the green can program to allow household foodwaste (excluding meat, dairy, poultry, fish).

Multi-Family Complexes

- Mandate that by 2010, all private haulers serving apartments and condominiums provide recycling services and demonstrate a diversion level of 25%; this can be achieved via a source separation program or delivery of as-collected material to a certified processor, or both. Work with the haulers stakeholders group to facilitate program development and obtain feedback on implementation.
- Mandate that all developers of new or remodeled complexes submit a recycling plan for approval before building permits are issued covering both construction and ongoing residency.
- Based on the results of the pilot programs, expand the recycling programs to 50% of the City by 2010, and 100% by 2015.

Commercial Sector

- Implement a blue can curbside recycling pilot program for small businesses
- Increase the BOS recycling rebate for material delivered to MRFs $2.00/ton per year starting at the current base of $25/ton for 2005. As economics shift over time, gradually reduce the rebate until the program becomes cost neutral and the rebate is no longer needed as an enticement.
- Establish financial incentives to encourage private haulers to establish wet/dry collection systems to maximize diversion; with the wet material going to CTs or composting and dry to MRFs or CTs. As economics shift over time, reduce the incentive until it is no longer needed.
- Mandate that all private haulers serving commercial businesses provide recycling services and demonstrate a diversion level of 50%; this can be achieved via a source separation program (providing additional bins) or

delivery of material to a certified processor. Work with the haulers stakeholders group to facilitate program development and obtain feedback on implementation.

- Mandate that supermarkets in the City of Los Angeles switch to biodegradable plastic bags. Also, seek partnerships with supermarkets to offer a nominal discount (5 to 10 cents per bag) for shoppers who provide their own bags.
- Establish an incentive program though which businesses are given a "Green Business" or "Zero Waste" score similar in concept to the A, B, or C rating given to restaurants by the health department. The program, certified by the City Environmental Affairs Department (EAD), would give awards to those companies scoring the highest in resource and energy conservation, recycling, air and water quality control, and other environmental criteria. The companies could then use their rating level for "bragging rights" or marketing advantages.

C&D Sector

- Approve the City's draft C&D recycling ordinance (See **Appendix H**).
- Increase the BOS recycling rebate for material delivered to processors $1.00/ton per year starting at the current base of $10/ton for 2005. As economics shift over time, gradually reduce the rebate until the program becomes cost neutral and the rebate is no longer needed.

Facility Development

- Revise the City Zoning Code to allow CTs by right in all M-2 and M-3 zones with the following conditions:
    - Located away from residential areas
    - Use of recycled content construction materials and other LEED construction practices
    - High quality, aesthetic architecture
    - Planting of extensive native and drought tolerant landscaping
    - Stormwater management
    - Energy conservation
    - Fully-enclosed operations with negative air pressure, state-of-the-art dust, odor and air quality control systems
    - Participation in community amenities funds
- Initiate development of the first CT project at a minimum of 500 TPD and expandable to at least 1,500 TPD - possibly co-located with existing MRF/transfer station.
- Streamline and support facilitate permitting and approval process for existing and new MRF and transfer facilities to expand mixed waste processing capability.
- Work with DWP to reserve key City-owned industrial land for future CT development to facilitate reaching DWP's RPS goal of 20% by 2017.

Renewable Energy

- Establish a green energy producer bonus from DWP for CTs generating renewable energy.
- Facilitate potential siting of CT facilities at existing DWP power plants, or in close proximity to transmission lines.
- Support DWP's RPS program by providing bonus credit in the RFP selection process for any renewable energy facility located within City limits.

Market Development

- Increase the effectiveness of the RMDZ program and support increased diversion by offering re-manufacturing companies lowered city business taxes (to as low as zero) based on performance for the first 10 years in addition to the existing low interest loans.
- Work with State Legislature to mandate Caltrans use of City-generated mulch on State highway landscaping.

Procurement

- Complete the draft Procurement Ordinance to encourage not only highest recycled content, but highest and best use.
- Continue to mandate City purchase of greenwaste mulch and compost for Parks & Recreation and other departments.
- Increase the "favored" status of recycled content (RC) products by upping the price break on Requests for Bid; likewise for products that are themselves easily recycled or remanufactured.
- Mandate the use of biodegradable plastic lawn bags for greenwaste, thereby eliminating the major source of contamination for this material going to composting or biological CT plants.
- Mandate that all plastic bags purchased by the City be biodegradable
- Give additional consideration in the City RFP process to bidders that demonstrate Extended Producer Responsibility (EPR).

Education and Outreach

- Expand the business and manufacturing education and outreach program with a focus on how waste minimization can reduce trash bills and increase profitability.
- Expand education and outreach programs to single family homes, including stickers for the cans regarding what is and is not acceptable in each can.
- Enroll corporate sponsors and develop private/public partnerships to support new school programs.

Environmental Justice

- Establish an Environmental Justice report card whereby each City Council District must participate by hosting existing and new facilities. Facilities are estimated to have the following impact potential:
    - Landfill: Very High
    - Transfer station/MRF High
    - CT: Medium
    - C&D processor: High
    - Greenwaste processor: Medium
    - Clean MRF: Medium
    - Compost distribution facility: Low
    - S.A.F.E. Depot (for HHW): Low
- Mandate each of the six refuse collection districts host one CT facility, with the siting of the seventh plant being flexible based on opportunity.

Funding

- The City of Los Angeles will realize approximately $4 million per year from its percentage of tip fees at the Sunshine Canyon Landfill. This will increase when the City-side expansion of the site comes online in the summer of 2005. This fund should be earmarked for support of alternatives to landfill disposal.
- If franchise programs are required for implementation of portions of the plan, use the franchise fees to fund CT development.
- If current funding through the 10% franchise fee is not sufficient to support BOS programs as part of this plan, increase the fee as needed.
- As a reward or penalty to the private sector haulers, increase or decrease the franchise fee on a graduated scale depending on their demonstrated level of diversion in the commercial and multi-family sectors.
- Apply for California Energy Commission PIER grants for funding of CT facilities producing renewable energy.

Education and Public Outreach

The Bureau of Sanitation has extensive experience in education and outreach having rolled out the curbside recycling program, and pilot programs for the multi-family, commercial and foodwaste sectors, among a myriad of other programs. What is crucially needed is more funding for the existing education and outreach programs as well as new programs that will target future plans and programs in this blueprint.

Unlike other jurisdictions where the government performs all the collection or works with only a handful of franchise haulers, in Los Angeles, because of the presence of many independent private haulers, much of the outreach and education will be directed at the industry rather than residents. The Bureau of Sanitation is experienced in setting up such dialogues with industry through its ongoing outreach programs with "stakeholder" working groups. These workshops are specifically set up to gain input from the industry and interested public and environmental groups on programs the Bureau is considering.

They have been successful in garnering industry support and cooperation, to the extent possible in a City with over 140 permitted hauling companies.

Also, it will be critical to involve the environmental community in the ongoing work to bring this blueprint to fruition. There has been sustained opposition from a couple groups at the State level in Sacramento to CT, primarily centered around fears that CT would undermine existing recycling systems and carry unacceptable environmental impacts. Although recent work by the CIWMB has proven both these fears to be without substance, there is still work to be done in education and outreach to some important local and State environmental groups including, but not limited to:

- The Sierra Club
- The Clean Air Coalition
- Environment California
- Californians Against Waste

Education and outreach regarding CT and the new paradigm of Zero Waste will also be vital for our elected officials. This will involve many meetings with City Councilmembers and their staffs, the Mayor and his staff, Neighborhood Councils, the DWP, offices of State Legislators, and other political and institutional stakeholders, including the Governor's office and members of the CIWMB and the SCAQMD.

It will also make sense to coordinate, educate and update other key players in the region which could include adjoining cities who may want to partner on CT projects with the City of Los Angeles, and also the Los Angeles County Sanitation Districts. Although the latter has historically operated its system to the exclusion of the City, it may be in both parties' interest to at least open a dialogue on possible synergies in the future. LACSD has participated in partnerships with cities in the past, as evidenced by the SERRF project in the City of Long Beach and the Commerce WTE plant in that city.

Depending on which programs and policies are selected for implementation, areas of focus for future education and outreach efforts in Los Angeles are:

Single Family Homes

- The addition of foodwaste to the green can for single family homes
- Reduction of contamination in blue can recyclables
- The possible addition of a variable can rate for the black can
- Single family home backyard composting and grass-cycling with mulching lawnmowers

Multi Family Units

- Multi-family recycling in whatever form it takes based on results of the ongoing pilot programs

Commercial Sector (businesses, institutions, hospitality sector, etc.)

- Commercial sector source-separation recycling based on results of the ongoing pilot programs
- Expansion of the restaurant and bar foodwaste recycling program

Private Haulers, Landfill Operators and other Stakeholders

- Programs mandating delivery of material to MRFs
- Programs involving AB939 fees
- Programs involving mandatory diversion levels
- Introduction of CT – processes, companies, performance, costs and benefits, European and Japanese experience, environmental impacts

Government, Regulators and Policy Makers

- Education regarding overall system design, operation, goals, etc.
- Liaison regarding possible program and facility partnering
- Issues mitigation and conflict resolution work

Market Development

One of the critical elements of any diversion program, be it recycling, composting or conversion, is the value of the products created and the strength of the markets into which they are sold. To a significant degree, the value of these products allows diversion and conversion technologies to compete with disposal alternatives.

The sections below discuss markets as they relate to this 20-year blueprint.

Traditional Recyclables

Historically, a substantial amount of material continues to be marketed in the Los Angeles region, and this trend continues today. Some of the major "end users" in the LA area include paper mills, plastics processors, and glass bottle plants.

However, even with this strong local market presence, the traditional markets for paper, cardboard, plastic, glass and metal from the residential blue can and commercial source separation programs continue to strengthen due in large part to the impacts of the growth in the economies and standard of living in China and India. The demand these two countries with the largest populations on earth are creating for recycled fiber, plastics and other commodities has driven the West Coast market over the past few years and is expected to continue to be the major force.

The intent of the CIWMB's Recycling Manufacturing Development Zone (RMDZ) program is to entice companies that manufacture products out of recyclables to come to California. In fact, the entire City of Los Angeles has been designated an RMDZ, in which the City provides support to companies on permitting and zoning issues and the State provides low interest loans.

The CIWMB and the City are currently working on the development of a database of the companies taking advantage of the RMDZ program or re-manufacturing recyclable material into new products. However, in discussions with City representatives, it was noted that more could be done to encourage manufacturers to locate here. For example, going beyond low interest loans to include possible tax credits and other "business friendly" incentives.

Greenwaste

The markets for greenwaste have been developing over decades in Los Angeles, and both federal and state organizations have been developed to support the industry, such as the U.S. Composting Council, and the California Organics Recycling Council (CORC).

The greatest challenge with this material is the sheer volume of it compared to the capacity of existing markets - and the tonnage continues to grow each year, outstripping the demand. This has forced processors to look for low-level methods to simply "get rid of the stuff" - often at significant cost. Examples include its use as Alternate Daily Cover (ADC) at landfills, and as a soil amendment when applied directly to agricultural lands.

This trend toward ADC is readily apparent at the State level as 2003 numbers have become available. Although composters and mulchers Statewide processed an astounding 9.8 million tons of greenwaste and wood waste, almost half of it (47%) was used as ADC. Another 20% was sold as biomass fuel, 11% went to the landscape market, 10% to agriculture, 2% to nurseries, and only 1% to Caltrans. The latter is one of the huge virtually untapped markets for processed greenwaste, and the State of California should be working with that agency to play a greater role in stabilizing and increasing the local market.

Unfortunately, greenwaste compost is not a high value product as it is typically low in nutrient concentration, and has not been readily embraced by the agricultural community. However, with the addition of foodwaste to the program, a better product can be made, with higher nutrient concentrations, water retention ability and crop yield all resulting in higher pricing, and better acceptance by farmers. One success in this regard has been the City of San Francisco's foodwaste program. 100,000 TPY of greenwaste and foodwaste collected by Norcal, the City's franchise hauler, is composted at the Company's Jepson Prairie Organics facility via windrows and Ag Bags. The product has been embraced by the local vintners as an excellent soil amendment for the vineyards.

Even with more of these types of success stories, it is clear that other markets for greenwaste would be very beneficial. This is where CT can play an important role by transforming the material into renewable electricity; clean fuels such as ethanol, liquefied natural gas (LNG), and hydrogen; and green chemicals such as acetic acid.

Non-Traditional Markets

One of the great advantages of CT is that it provides new markets for recovered materials and energy. As discussed above, the recovered supply of some of our traditional materials and in particular our greenwaste often exceed the demand, forcing prices down and in some instances a low end and expensive use of the product.

By transforming organic waste into renewable energy, fuels, and chemicals, CT opens up vast new markets in California, where there is a huge demand for such commodities. It also takes some of the strain off our traditional markets for compost, soil amendment and mulch, thereby increasing the value of material sold into them.

Renewable Portfolio Standards (RPS)

Here in Los Angeles, the DWP has made a commitment to purchase 700-800 MW of renewable capacity by 2017 (to meet a 20% RPS), and at a premium of up to $0.07/kWh. This is a huge amount of electricity. DWP is actively pursuing new renewable energy sources by issuing annual RFPs and signed its first contract in 2004 with a greenwaste digestion project, Bio-Converter Park LLC. If all the organics in the City of Los Angeles's wastestream that are now being landfilled (approximately 10,500 TPD) were converted to energy in CT facilities, the MW capacity that could be produced by 2025 would range from 100 to 340 MW depending on the mix of CT utilized. This would ultimately provide a significant portion of the RPS target.

Not only does renewable energy decrease our demand for foreign and new supplies of domestic oil and other fossil fuels, it reduces greenhouse gases, and creates local jobs at the new facilities that would be constructed to generate this electricity.

Ethanol

The allure of fermentation CT in Los Angeles is that ethanol could be manufactured not from grain, but from the organic material in our wastestreams. This provides even more advantages in terms of greenhouse gas reductions and clean air benefits, plus generating home grown energy and the jobs and economic drivers that go along with it.

The U.S. currently produces and consumes roughly 3.5 billion gallons of ethanol per year as a clean burning, home grown transportation fuel. This volume is produced by 83 ethanol plants with 15 new plants and two major expansions in construction. When these come on line during 2005, production capacity will increase to 4 billion gallons per year.

In Washington D.C., on March 16, 2005, the Senate Environmental and Public Works Committee passed S.606, the Renewable Fuels Act, which establishes a new Renewable Fuels Standard (RFS) that reaches 6 billion gallons by 2012. A bipartisan group of Senators has also introduced legislation that would increase this RFS to 8 billion gallons in the same timeframe.

In California, ethanol is in huge demand with over 700 million gallons per year currently consumed in the State (and much of that, of course, in Los Angeles) under the MTBE additive replacement program. Currently, virtually all this ethanol is made from corn and comes from out of State. And this is at a very low percentage ethanol blend. If the blend were increased to 10% (E-10) or more (i.e. Brazil uses vehicles that burn an 85% ethanol blend (E-85)), the demand for the product would be almost unimaginable.

In addition, hydrogen can be derived from ethanol; therefore, these fermentation plants can ultimately support the Governor's "Hydrogen Highway" concept.

Liquified Natural Gas

LNG demand is also on the rise in California as truck fleets continue to convert to this clean burning transportation fuel to meet AQMD standards. One innovative and sustainable aspect of LNG is that it can be created from the organics in our waste and used to fuel the refuse collection truck fleets, thus closing the loop in a certain way. Projects are currently going in at landfills, converting landfill gas to LNG. However, the same technology could also be used at CT facilities to convert syngas and biogas to LNG.

Chemicals

The ability of fermentation plants to produce not only ethanol but a wide array of chemicals creates a connection with a whole new world of almost unlimited potential, the domain of the Dow Chemicals and Duponts of this world.

Clearly, the advent of CT will markedly impact in a positive way the markets for our recyclable and compostable materials. Not only re-creating a healthy balance between supply and demand, but creating local jobs, reducing transportation impacts, and improving air quality – all at the same time. Only in this way, will our society and manufacturing base be able to absorb the millions of tons per year of new material that will be diverted in the future under this Zero Waste blueprint plan.

ECONOMICS OF THE BLUEPRINT

"The Los Angeles area must reclaim its commitment to broad-based economic growth and job creation as the single most effective way to lift people from poverty and help them achieve upward mobility."

Lee Hamilton, President and CEO
(Los Angeles County Economic Development Corp.)

Perhaps the most compelling rationales for striving to realize Zero Waste goals are the economic benefits of recycling. Those with special resonance for the City of Los Angeles include:

- promotion of local economic growth
- creation of local jobs in the construction, design and engineering sectors (with a 7:1 dollar multiplier effect)
- creation of local, permanent operational "Green Collar" jobs (with a 10:1 dollar multiplier effect)
- reduction of traffic congestion and the air pollution caused by trucks traveling long distances to landfills

Achieving Zero Waste could add hundreds of "green-collar" jobs in neighborhoods hardest hit by underemployment, provide growth and training opportunities for those already employed, increase local economic growth through entrepreneurship and small businesses, improve the quality of life and productivity of residents, and increase local government revenues.

How is this possible? What are the economic rationales for recycling and re-use of waste rather than disposal? The recycling and reuse of household and industrial wastes has become more economically compelling because:

- the cost of waste disposal has been increasing (and will reach $100 per ton by 2023 according to a recent LACSD presentation[25])
- improvements in technologies for processing and material recovery are continuing
- long-term costs of raw materials are rising
- industrial techniques are replacing artisan methods of disassembly and reprocessing, and
- products are now being designed to be recycled more easily[1]

Data suggest that disposal and diversion activities have already had a significant impact on the California economy. For example, a 2001 report[2] to the California Integrated Waste Management Board noted that in 1999 the direct and indirect economic impacts of solid waste disposal and diversion were:

- more than $9 billion in sales
- more than $21 billion in total output
- almost $8 billion in total income
- almost $11 billion in value added benefits, and
- more than 179,000 additional jobs

The same report discovered that **diverting** solid waste has a significantly higher benefit to the economy than **disposing** of it. As shown in **Table 1.4**, when material is diverted rather than disposed in California:

- total sales and value-added impacts more than double
- output impacts and total income impacts nearly double, and
- the jobs impact nearly doubles

TABLE 1.4
1999 AVERAGE IMPACTS STATEWIDE (CA) FOR DISPOSAL OR DIVERSION[3]

Category	Disposed	Diverted	Additional Gain from Diversion (Difference)
Total Sales ($/ton)	$119	$254	$135
Total Income Impact ($/ton)	$108	$209	$101
Jobs Impact (Jobs/1,000 tons)	2.46	4.73	2.27

California in general and Southern California in particular have been leaders in profiting from the recycling and reuse of residential, commercial and industrial waste. **A 2002 report by the Los Angeles Bureau of Sanitation shows that Los Angeles hosts more than 600 recycling and reuse establishments that employ nearly 8,000 people, generate an annual payroll of $207 million, and gross $1.8 billion in annual revenues.**[4] Nationwide, according to the *U.S. Recycling Economic Information Study*, the recycling and reuse industry consists of approximately 56,000 establishments that employ more than 1.1 million people, generate an annual payroll of nearly $37 billion, and gross over $236 billion in annual revenues. This represents a significant force in the U.S. economy and makes a vital contribution to job creation and economic development.[5] Nonetheless, it's clear that the economic potential of this industry has barely been tapped.

Comparisons of Systems

Over the next twenty years there will likely be six general systems for managing the City of Los Angeles' wastestreams, focusing on the MSW from the residential (black can), commercial and C&D sectors still going to landfill disposal. These systems form a progression from simple to more complex, from no recycling to maximum recycling, from a waste disposal based system to a resource recovery based system. They are not mutually exclusive but overlapping in a continuum. In fact, all occur simultaneously at some point in the future. These systems are summarized below (the italicized portions in the titles represent additions or modifications from the previous scenario):

1. **Local Landfills (Figure 1.4)**
   Historically, direct haul to landfills has been the simplest system in Los Angeles. At one time, there were as many as 20 local landfills from Palos Verdes, to the Sepulveda Pass, to Griffith Park, to Sun Valley. Collection trucks would merely complete their route and drive to the nearest site to dump. This still occurs, but on a decreasing basis due to the closure of most of these easily accessible landfills. Once the one-way haul distance reaches 15 miles or so, and depending on traffic congestion, it becomes more economical to transfer waste to larger trucks. Hence, the next system.

Figure 1.4

Scenario One
Direct Haul to Local Landfill

RENEW LA

2005 - 2025

A Resource Management Blueprint for the City of Los Angeles

2. ***Transfer and Haul to*** **Local Landfills (Figure 1.5)**
This has become one of the dominant systems in the region as some local landfills have closed resulting in longer hauling distances. In this system, collection trucks tip their loads at transfer stations where the material is loaded into 18-wheel semi trucks for haul to landfills. Typically, anywhere from two to four collection truck loads can be consolidated into one transfer truck load, thus creating large system savings, and reduction of traffic impacts.

3. ***MRF/*****Transfer and Haul to Local Landfills (Figure 1.6)**
To some extent now, and certainly to a great extent in the future, transfer stations will be equipped with processing equipment for recovering recyclable material during the transfer process. This recovery helps meet AB939 targets, provides revenue from the sale of the recyclable materials, and saves hauling and landfill disposal fees as well. The latter savings (termed 'diverted disposal' savings) becomes more important as disposal costs increase. In the not too distant future, all material may be required or "incentivized" to flow through MRFs for processing before hauling to disposal.

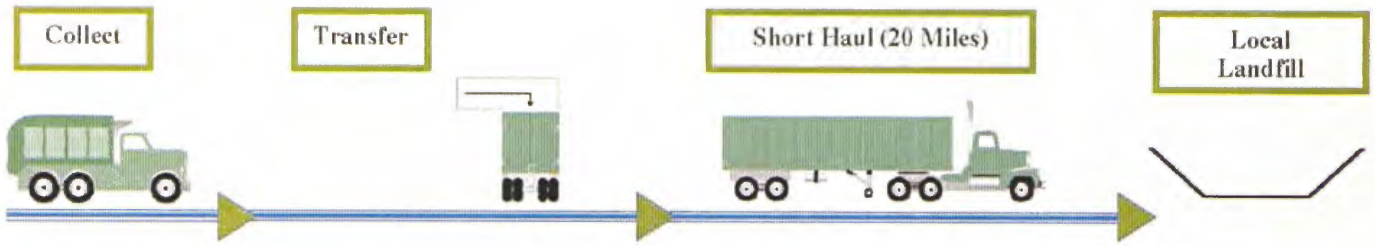
4. ***MRF/*****Transfer and *Long-Haul to Distant Regional Landfills* (Figure 1.7)**
As older landfills in the urban areas continue to fill and close, long-haul by transfer truck of 50 to 100 miles and even further will be necessary to reach large outlying disposal sites. Some of this system activity is occurring today, and will become more prevalent with the closure the Bradley West, Chiquita Canyon and Puente Hills landfills within the next eight years.

5. **MRF/Transfer and *Rail-Haul to Remote Desert Landfills* (Figure 1.8)**
This is the next system being planned today for implementation by late 2009, principally by the LACSD. Longer hauls, in the 200-300 mile or even 500-700 mile distance, lend themselves to rail transport as opposed to trucking. One double-stacked container train can replace as many as 200 semi-trucks. The LACSD has plans in place for two 4,000 ton payload trains a day to be hauled from a new intermodal yard in Puente Hills to the Mesquite Regional Landfill in the high desert. Other transfer stations could also pack shipping containers that could be trucked to this intermodal yard or others for inclusion in new trains. LACSD plans to subsidize the high cost of Waste-By-Rail by a gradually increasing "levelized" fee charged to all tonnage across their system, especially that received at the two existing LACSD landfills (Calabasas and Puente Hills). As calculated by the LACSD, levelized rates will reach $35/ton by 2010, $40/ton by 2012, $50/ton by 2015 and ultimately hit $100/ton in 2023, when essentially all waste would be going to rail haul (if CT plants are not developed as discussed in Scenario 6 following).

Figure 1.5

Scenario Two

Transfer & Short Haul to Local Landfill



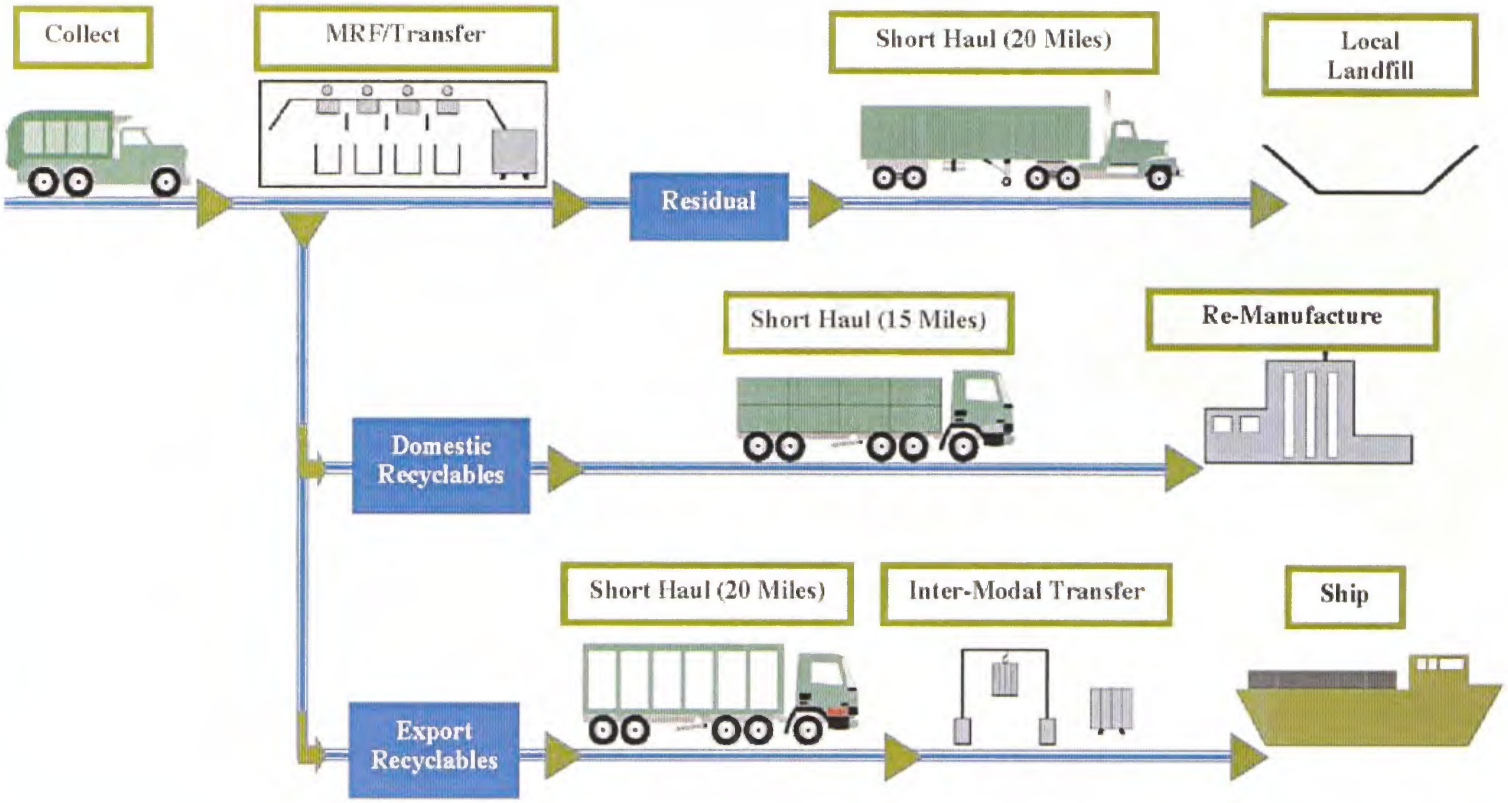
RENEW LA

A Resource Management Blueprint for the City of Los Angeles

Figure 1.6

Scenario Three

MRF/Transfer & Short Haul to Local Landfill



RENEW LA

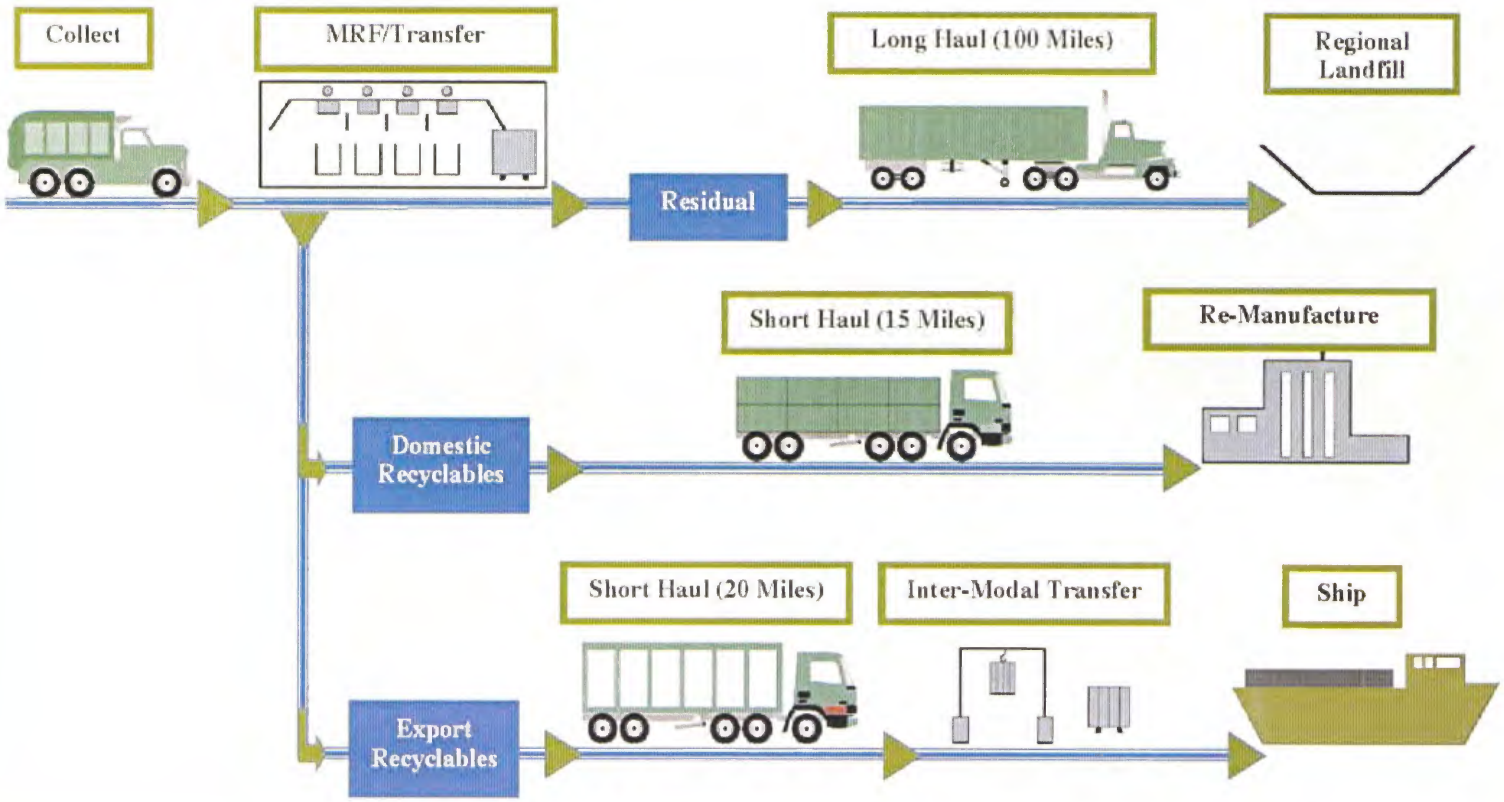
2005 - 2025

A Resource Management Blueprint for the City of Los Angeles

Figure 1.7

Scenario Four

MRF/Transfer & Long Haul to Distant Regional Landfill



RENEW LA

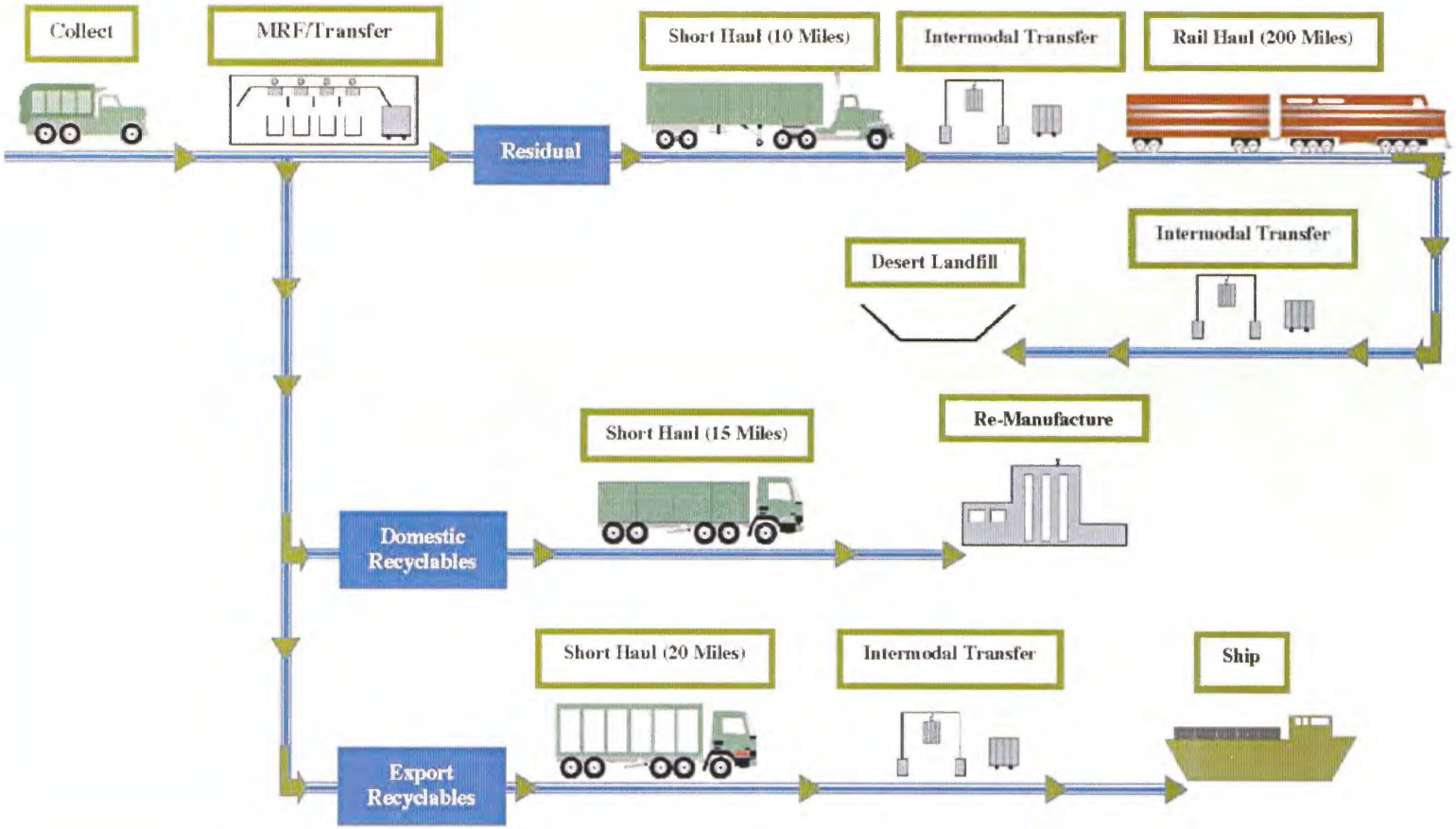
2005 - 2025

A Resource Management Blueprint for the City of Los Angeles

Figure 1.8

Scenario Five

MRF/Transfer & Rail Haul to Remote Desert Landfill



RENEW LA

2005 - 2025

A Resource Management Blueprint for the City of Los Angeles

6. **MRF/Transfer, *Convert and Haul to Local Inert Repositories* (Figure 1.9)** This is the system put forth in this report. In truth, it involves much more than these unit functions, including new programs in manufacturing (such as Extended Producer Responsibility), and in reuse (such as de-construction) among many other policies and programs to begin to minimize the amount of material that enters the wastestream. This system combines intensified source-separation programs and mixed material processing at new and expanded MRFs to recover traditional recyclables, with new CTs that process the residual waste and produce everything from paper pulp, to ethanol, to bio-based chemicals, to renewable energy. The goal of the system is to recover and convert over 90% of the current and projected wastestream, leaving only a small inert residual requiring disposal.

Table 1.5 provides a summary of average costs per ton for the six basic scenarios. These numbers are ***approximate*** and of necessity ***generalized***, and will vary in real world applications depending on facility locations, types of waste handled, facility capacity, type of technology, and other factors. In some instances for example, it may actually be less expensive to transfer and long haul (Scenario 4) than to transfer and haul to the local landfill due to widely divergent landfill tipping fees.

However, the costs in the table do reflect "typical" industry numbers for the greater Los Angeles region and are intended for comparison purposes to give indications of median values for wider cost ranges within each system. Costs in **Table 1.5** were derived from a variety of industry sources, existing facility tipping fees, and vendor bids as detailed in Section 6 of this plan.

The days of cheap landfilling are nearing an end as local landfills close and our basic system transitions from direct haul, to transfer, to MRF/transfer, to long truck haul, to rail haul, and ultimately to conversion technology. In fact, if everything were to go to rail haul, costs would top $100 per ton by 2023, according to the LACSD[25]. Before this summit is ever reached, conversion technologies will come into their own.

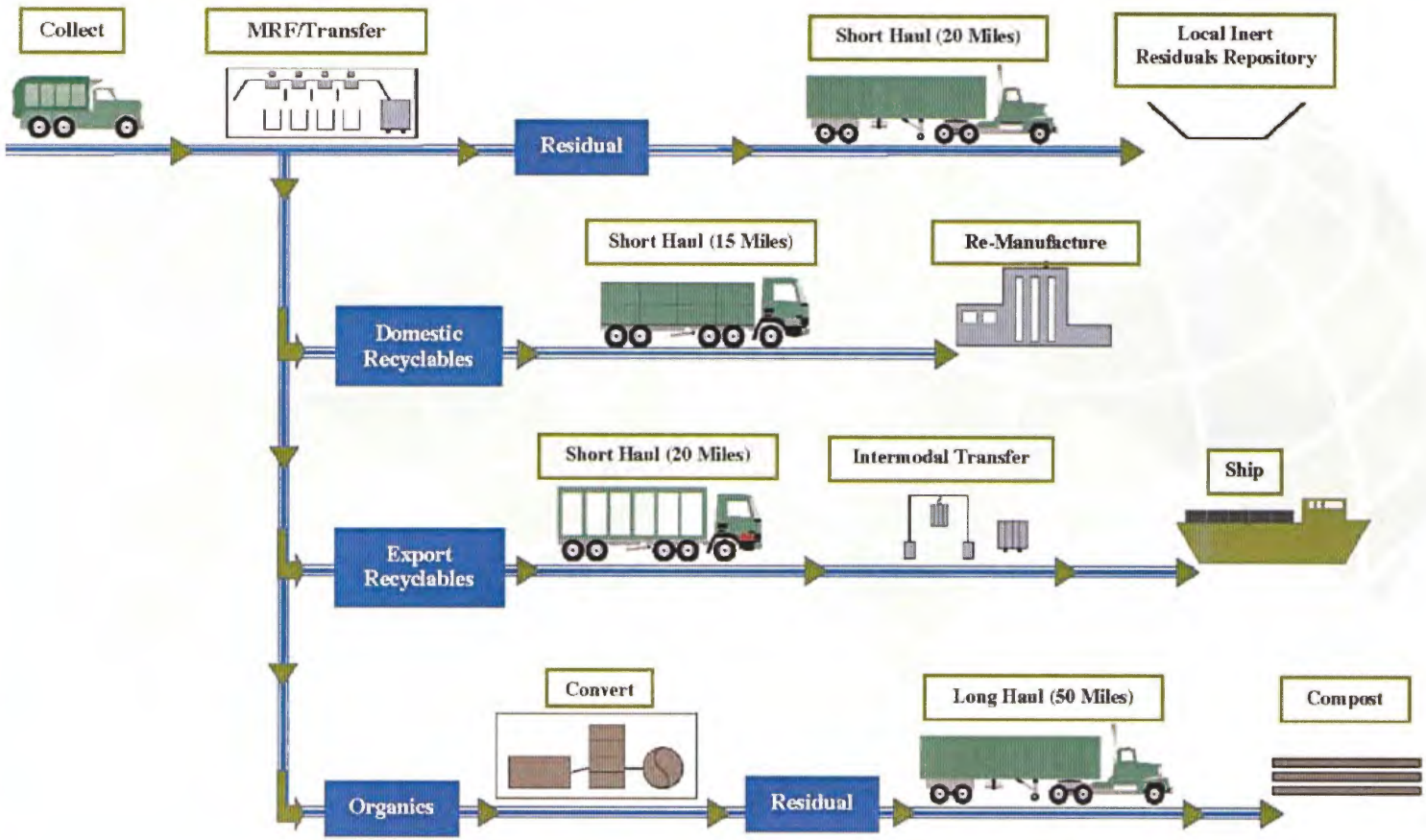
RENEW LA

2005 - 2025

Figure 1.9

Scenario Six

MRF/Transfer & Convert & Haul to Local Inert Repository



A Resource Management Blueprint for the City of Los Angeles

TABLE 1.5
RESOURCE MANAGEMENT SYSTEMS
OVERVIEW COST COMPARISON (***)

No.	System	(2005 $) Cost Components	Total Cost ($/ incoming ton)
1	Local landfill	Local Landfill Tipping Fee	25
		Total	***$25***
2	Transfer and Haul to local landfill	Transfer	6
		Haul to Landfill (20 miles)	5
		Local Landfill Tipping Fee	25
		Total	***$36***
3	MRF/transfer and haul to local landfill	MRF processing (*)	15
		Transfer (85% of the material)	5
		Haul to Landfill (20 miles) (85%)	4
		Local Landfill (85%)	21
		Total	***$45***
4	MRF/transfer and long haul to distant regional landfill	MRF processing	15
		Transfer (85%)	5
		Haul to Landfill (50 miles) (85%)	7
		Regional Landfill (85%)	21
		Total	***$48***
5	MRF/transfer and rail haul to remote, desert landfill (LACSD system approx.)	MRF processing	15
		Transfer (85%) (++)	7
		Rail haul to Landfill (250 mi) (85%) (+)	17
		Remote Landfill (85%)	21
		Total	***$60***
6	MRF/transfer and conversion with haul of residual to local inert repository (RENEW LA system)	Feedstock processing	7
		Conversion (**)	50
		Residue Transfer (15%)	1
		Haul to landfill (20 miles) (15%)	1
		Inert landfill (15%)	1
		Total	***$60***

(*) Assumes MRF achieves 15% diversion
(**) Assumes CT achieves 85% diversion
(***) Does not include collection truck haul to the first facility (landfill, transfer station, or MRF)
(+) Includes full intermodal and shuttle operations on both ends
(++) More expensive due to use of compactors vs. simple top loading

The Externalities

Historically, all of our economic analysis of solid waste management systems has focused on tipping fees. But in reality, this is an overly simplistic and essentially inaccurate measurement of the true costs and benefits of such systems. A fully-allocated analysis would take into account not only the costs of the system, but the *benefits* as well. Such a model would include the so-called "externalities", those costs and benefits that are real, but generally not valued or quantified in the analysis. A fully-allocated cost/benefit analysis would include the following:

Costs

- Traditional costs of facilities and labor (the "Tipping Fee")
- The environmental and health costs of the pollution to air, water and land caused by the truck and rail transportation; and the recycling, transfer, conversion and landfill facilities themselves (greenhouse gases, NOx, SOx, particulate matter, CO, methane, heavy metals, toxics, PAHs, ROGs, VOCs, etc.)
- The long-term liability cost of the system as a whole (i.e. potential future groundwater contamination)
- The cost of virgin resource depletion
- The cost of freeway congestion caused by truck traffic, and railroad congestion caused by added trains; all of which equates to loss of transportation capacity and commuter time while generating more air pollution
- The incremental cost to public safety of the additional truck traffic

Benefits

- Traditional revenue streams from the sale of recyclables, compost, energy
- The value of new jobs primarily in the high paying manufacturing sector
- The value of new City tax revenue from new local businesses
- The added value of green energy
- The value of reducing our dependence on foreign oil
- The value of a sustainable, renewable, system
- The value of a system based on conversion technologies with net zero greenhouse gas emission

Such an in-depth analysis has never been performed to our knowledge. Admittedly, as important as some of these elements are, some are difficult to quantify - and thus are typically ignored. Were all the "externalities" to be taken into account, both on the cost and benefit side, advantages would accrue to the "zero waste" paradigm.

Some of these externalities are discussed on the following pages as they pertain to projects in Los Angeles.

Transportation

The RENEW LA plan, based on enhanced diversion programs and local CT facilities and residual repositories will result in a significant reduction in trucking and rail haul. This is particularly true when compared to future long haul options in which MSW would be trucked or railed hundreds of miles to remote landfill sites. The following will be achieved by the RENEW LA plan:

- Reductions in air emissions
- Reductions in traffic congestion on freeways and rail lines
- Reductions in wear and tear on the roadways
- Reductions in truck and rail related accidents

Energy

The seven CT facilities will generate between 100 and 340 MW of power depending on the mix of technologies developed. Assuming an average value of 220 MW, this green, renewable energy will achieve the following:

- Significant contribution toward DWP's RPS goal of 20%
- The reduction of roughly 1 million barrels of crude oil
- Reduction in imported oil and related national trade deficit
- The reduction of 400,000 tons per year of greenhouse gases as compared to the use of fossil fuel

Jobs

Development of the seven CT facilities can be expected to create approximately:

- 1,400 construction jobs
- 350-500 permanent jobs (admin., management, operation, maintenance, etc.)
- Jobs in the engineering, architecture, landscape design and other support industries

Environmental Quality

In addition to the transportation issues already discussed, CT plants as compared to landfills produce lower: air emissions, stormwater runoff, potential groundwater contamination, nuisance conditions such as dust, odor and litter, and long term liability risk.

ACTION PLAN

This plan is a dynamic system, and it must be so to be effective. No one can forecast the future with exactitude, especially with rapid advances in technology. Therefore, it is not in the City's best interest to lay out program specifics for a twenty year period.

What the City *can* do is lay out a framework for the future, a purpose and a direction – and then a plan for each of the first steps. These first steps are critical in that they start the shift from the old paradigm to the new.

This section lays out the key actions for the next five years (2005-2010). Beyond that, this blueprint should be updated and modified as needed by the RENEW LA oversight committee.

The twelve most important actions for the near term launching of this blueprint are listed in **Table 1.6** on the following page.

Section 7 of this plan provides more detail on these 12 actions, as well as the proposed MOTIONS developed by Councilman Greig Smith for adoption by the Los Angeles City Council.

CONCLUSION

We live in an unprecedented time in which a confluence of factors is encouraging the City of Los Angeles to take bold action and develop a new paradigm in resource management. These factors include:

1. The drive for greater waste diversion and less disposal
2. The mandate for green energy and the 20% RPS for DWP
3. Growing traffic congestion and concern over exhaust emissions
4. The need for local jobs and a revitalization of our manufacturing sector
5. The desire to reduce our dependence on foreign oil
6. Concerns over greenhouse gas emissions and global warming
7. The need to conserve natural resources
8. The need for home grown energy and clean burning fuels

These factors all point to a new system called **RENEW LA** in which the residual material now going to landfills will be converted into recyclables, compost, renewable fuels, bio-chemicals, and green energy.

Los Angeles can lead the country in the shift to this new paradigm of sustainability, environmental protection, and green industry. This blueprint lays out the plan on how to get there.

From here, it's simply a matter of will.

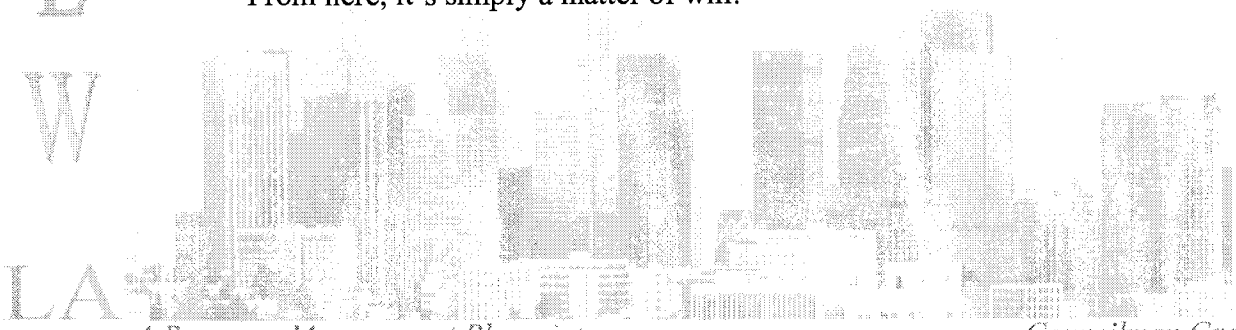


TABLE 1.6
TOP 12 RECOMMENDATIONS FOR ACTION
(2005-2010)

Recommended Action	Acting Body	Timing
1. Establish RENEW LA Oversight Committee	LA City Council	2005
2. Adopt "Blueprint" and Zero Waste Policy	LA City Council	2005
3. Add residential foodwaste to the green can program	Bureau of Sanitation	2006
4. Modify Zoning Code to allow CT by right in M-2 and M-3 zones with conditions	City Council	2006
5. Establish site areas for CTs in each of the Collection Districts	City Council Bureau of Sanitation Private Sector	2005-2007
6. Site and develop 1st and 2nd CT facilities	**Bureau of Sanitation City Council Private Sector**	**2005-2010**
7. Establish fund from Sunshine Canyon host fees for development of facilities that reduce landfilling	City Council	2006
8. Implement recycling in 50% of the commercial sector	Bureau of Sanitation City Council	2006-2010
9. Mandate time-certain reduction in City MSW disposed at Sunshine Cyn	Bureau of Sanitation City Council	2006
10. Expand multi-family recycling to 50% of the City	Bureau of Sanitation City Council	2006-2010
11. Establish City tax breaks for "Zero Waste" and new re-manufacturing companies	City Council	2005-2010
12. Establish a green energy producer bonus from DWP	City Council DWP	2006

SECTION 2

HISTORICAL PERSPECTIVE

INTRODUCTION

Solid waste management in the City of Los Angeles has taken many interesting turns that can inform our future actions. This section provides a short retrospective on where we have been.

PRE-1960: THE OLD FASHION WAY

Along the Southern California coast, archaeologists have found trash heaps in which native Tongva and Chumash peoples disposed of their abalone and mussel shells, fish bones, broken beads, spoiled projectile points, and other refuse. Today, these heaps provide a rich record of American Indian life, and an example of how solid waste was "managed" by our Native American predecessors.

Until the 1880s, waste disposal was a private concern for each household and business. In the late nineteenth century, sanitation became a matter of public health and waste management began to be loosely regulated. In 1890, the City of Los Angeles through its Bureau of Sanitation in the Department of Public Works constructed the first solid waste crematory (incinerator) providing a city owned and operated disposal service for residential refuse. In 1943, residential collection was turned over to City forces.

Up through the mid 1950's, the City allowed householders to burn combustible trash in backyard incinerators and to place their non-combustibles (mostly metal and glass containers) in a garbage can for collection by scavengers on flatbed trucks. These scavengers typically sorted the material into commodities for recycling – a precursor to today's curbside recycling programs. Material that could not be burned or recycled was buried in one of the more than 100 small dumps around town. At times, these dumps were also set on fire, thus achieving a form of volume reduction at the expense of air quality.

Food waste collected from restaurants and processing plants was fed to hogs at various ranches in the LA area. At one point in the 1940's there were over 100,000 hogs feeding on the City's waste. Subsequent problems with animal disease forced the ranchers to "cook" the food waste in crude autoclaves to kill pathogens. The added effort

and cost killed the entire program instead, and the food waste went back to the landfills from then until the present day.

Early approaches to landfilling had been developed by the U.S. Army in World War II and sanitary landfills became the military's preferred method of waste disposal on its bases. The strong military presence in Los Angeles during and following the war led the City to the forefront of landfill development in the United States. By the end of 1945, almost 100 cities in the US were using sanitary landfills. By 1960, this number had grown to 1,400. Landfills were loosely regulated by the U.S. Public Health Service and oversight was handed over to the Environmental Protection Agency (EPA) in 1970.

1960s: MAYOR SAM YORTY and COMBINED COLLECTION

By 1957, concerns about the air pollution generated by the backyard incinerators brought the practice to an end. Banning the burning of trash lessened air pollution but it increased opportunities for flies, mosquitoes, rats, and other disease vectors to propagate.

Sanitary landfills came into their own when backyard trash incinerators were banned. In the 1950s this seemed like the modern option and was preferred over composting, recycling, and salvaging. Not only was refuse collected, but it was compacted and buried. Larger, regional landfills came to replace the more than 100 small dumps located throughout the city.

In fact, Mayor Sam Yorty won the election of 1961 partially on a platform of solid waste reform that included the elimination of the need for residents to separate their trash into combustible and non-combustible fractions, and the advent of collection of all waste by new garbage trucks with hydraulic packing mechanisms to maximize payload weights. Thus recycling in Los Angeles was "out" and convenience was "in" until the advent of curbside recycling in the early 1990's a period of almost 30 years.

The first two "sanitary" landfills to open were in Palos Verdes and Pomona (the Spadra landfill) in 1957. Los Angeles was forced to take a leadership role in recognizing and monitoring landfill gas (LFG) in the 1950's. Vents were designed and installed to burn the gas following incidents at landfills in Monterey Park and Palos Verdes. These led to a study of landfill practices in Los Angeles and criteria for landfills were developed.

At this point, all trash was picked up either in rear-loading trucks for residential collection, or with front-loading trucks (with hydraulic forks) for commercial collection, or roll-off trucks for bulky industrial. There was essentially no recycling of this mixed material. The only real recycling was through private "scavengers" who collected source separated waste cardboard, newspaper, and office paper and delivered it to waste paper yards where the material was further sorted and baled for shipment to paper mills. Likewise, recycling of scrap metal occurred through the private sector.

1970s: BIRTH of the ENVIRONMENTAL MOVEMENT

Following the rise of a nationwide environmental consciousness, which triggered the formation of the U.S. EPA in 1970, California's first significant regulation of the solid waste industry began with the enactment of the Solid Waste Management and Resource Recovery Act of 1972.

In 1976, the U.S. Congress passed the Resource Conservation and Recovery Act, which led to the development of national criteria for managing dumps and landfills. However, since day one, the State of California has always maintained more stringent landfill regulations than the federal EPA, and therefore has essentially managed all disposal sites at the State level.

Through the years, the City of Los Angeles has owned, operated and maintained six landfills:

- Gaffey Street (San Pedro: opened 1955 / closed 1963)
- Toyon Canyon I and II (Griffith Park: opened 1957 / closed 1985)
- Branford (Sun Valley: opened 1957 / closed 1961)
- Mission Canyon (West LA: opened 1960/ closed 1982)
- Sheldon-Arleta (Sun Valley: opened 1962 / closed 1974)
- Bishops Canyon (Elysian Park: opened 1966 / closed 1969)
- Lopez Canyon (Lake View Terrace: opened 1975 / closed 1996)

The 1970's also saw the birth of the environmental movement, Earth Day, and the first residential recycling programs. These typically involved one or more bins in which residents placed newspaper, cans and bottles that were picked up by special trucks with multiple compartments. These materials were taken to the first Material Recovery Facilities (MRFs) for processing, baling and shipment to markets. Some of these early recycling efforts were funded in part through grants from the CIWMB.

During this time, the "re-manufacturing" sector continued to expand with development of paper mills and glass bottle plants using recyclable material as feedstock in the manufacturing of new paper products and glass bottles. Most of these plants are still active today, although an increasing percentage of these commodities are being shipped to mills and processors in Taiwan, South Korea, India, and most notably of late, China.

1980s: FOCUS ON WASTE-TO-ENERGY

The 1980's ushered in a new technology on the solid waste scene: Waste-To-Energy (WTE). This technology combined MSW incineration with water-wall boilers to generate steam and often electricity, thus creating heat and power with MSW as fuel.

With roots in Europe, the first American plants came on line in the 1970's on the east coast. U.S. companies obtained licenses for various European grate and boiler designs, with the facilities coming in two basic types: mass-burn and refuse-derived-fuel (RDF). The former, represented mainly by Wheelabrator, Martin, and Foster-Wheeler, accepted mixed MSW and fed it to the boilers with minimal pre-sorting to remove the odd large, unacceptable items. The latter, represented primarily by American Refuel and Thermal Electron, pre-processed the mixed MSW to prepare an RDF comprised primarily of paper and plastic.

Mass burn plants had the advantage of simplicity and performance history, whereas RDF plants could tout better fuel, lower air emissions, and a more complementary fit with traditional recycling programs. Both could claim the banner of renewable energy production; volume reduction of up to 90%, and weight reduction of 70 to 80%.

At one point in the mid-80's, dozens of WTE plants were on the drawing boards in California alone as a cleaner, more elegant disposal option to the existing landfills. What made WTE doubly attractive was that the utilities were hungry for new sources of power and were offering long-term, guaranteed contracts at $0.10/kWh or more for the electricity the WTE plants could produce from trash.

In the end, history will show that although over 150 plants were built in the U.S., only three were constructed in California: the Commerce plant (1,000 TPD, LA County Sanitation Districts); the Southeast Resource Recovery Facility or SERRF (2,240 TPD, LA County Sanitation Districts and the City of Long Beach); and Stanislaus County (1,700 TPD, Ogden Martin and Stanislaus County). All three are still operating.

According to the Integrated Waste Services Association, there are approximately 100 WTE plants burning MSW or RDF in the U.S. today. These plants combined combust roughly 15% of the total annual U.S. disposal tonnage, and generate 2,750 MW of power. Although plant upgrades, particularly in air pollution control, and expansions continue to occur, no new WTE plants have been built in over a decade.

As is often the case, several factors (whether perceived or actual) combined to bring the WTE revolution to a grinding halt across the U.S. in general and in California in particular:

- Growing public fears over toxic air emissions (dioxin, furans, heavy metals)
- Heightened concern over the environmental and public health impacts of the landfill disposal of the residual ash.
- A huge drop in energy revenues (roughly 50%) as the original utility contracts expired
- The birth of super-regional landfills that could attract waste from hundreds of miles away at prices below local WTE plants
- The passage of a Federal Law that declared "flow control" to be unconstitutional. Overnight, MSW that had been contracted to WTE facilities, and was needed to help repay the plant's debt, could be shipped to a competing landfill or any other facility.

And like that, the 20-year run for WTE was essentially over. However, this was not the case in the rest of the world, most notably Europe and Japan, where the industry is still expanding, although in-roads are being made there as well by new "conversion technologies" such as anaerobic digestion and gasification.

In the City of Los Angeles, a similar trajectory occurred with the initial success of the Commerce and SERRF plants quickly dimmed by the failures of the Irwindale and LANCER (City of LA) projects to overcome public opposition and get off the drawing boards. By 1990, the light of WTE had been eclipsed in Los Angeles and all of California by a new star - Assembly Bill 939.

1990s: AB 939 and the MANDATE FOR 50% DIVERSION

Coinciding with the decline of the WTE era was the ascent of "diversion from landfilling" on a massive scale with the passage of the California Integrated Waste Management Act of 1989 (AB 939). The State began to march to the drumbeat of the three "R's": "Reduce, Reuse, and Recycle". Among other things, the law mandated a 50% diversion level by the year 2000, as well as the creation of the various plans, programs and facilities that cities and counties throughout California would need to get there.

Helen of Troy may have had the face that launched a thousand ships, but AB 939 had the teeth that launched a thousand recycling programs, namely a $10,000 a day fine provision, that while never strictly enforced, certainly got the message across from the CIWMB that this was serious business.

Fifteen years later, the State of California and the City of Los Angeles have made tremendous strides in diverting material from landfills, with the former at an official 42% diversion rate and the latter at 62%. According to the latest CIWMB data, the majority of cities in the State have achieved at least the 50% level.

In the City of Los Angeles, AB 939 compliance has been achieved through a combination of policies and programs overseen by the Bureau of Sanitation that include:

- Residential curbside recycling (starting with the yellow bin in 1990 and transitioning in 1997 to the current 3-barrel system for separate collection of trash, recyclables, and greenwaste)
- Greenwaste chipping, grinding and composting
- Construction and demolition debris (C&D) recycling
- AB 939 hauler franchise fees
- Multi-family and commercial waste pilot programs
- School curriculums about the environment and focused on recycling
- Rebate programs for haulers delivering material to certified MRF operations for sorting recyclables and select waste streams
- Recycled content procurement policies
- And others

In 1994, the City Council of Los Angeles declared the goal of 70% diversion of MSW from landfills by the year 2010. In a similar vein, the City's Department of Water and Power (DWP) set a target renewal portfolio standard (RPS) of 13% renewable energy by 2010 and ultimately 20% by 2017, a whopping 1,000 MW of green power capacity. As detailed in the following chapters, conversion of MSW forms a nexus of both of these goals.

2000s: TARGETING ZERO (the rise of Conversion Technologies and the New Industrial Revolution)

The beginning of the 21st century has seen the dawning of a new paradigm in resource management that is reflected in the solid waste field by a "zero waste" philosophy. This philosophy is part of an over-arching movement called sustainability, in which the focus is placed on maximizing the beneficial use of our finite, and in many cases severely limited, natural resources.

Still a nascent movement, Zero Waste has been embraced by hundreds of jurisdictions as diverse as: the Country of New Zealand; Seattle, WA; Nelson, BC, Canada (pop. 15,000); San Francisco; and the California Integrated Waste Management Board.

In fact, the City's new diversion target of 70% is but one step on the Zero Waste path. The goal of the RENEW LA plan is to move beyond that 70% goal to a zero waste system as detailed in Section 4.

CONCLUSION

In looking back from where we've come, one can see a natural progression from the earliest sanitation services, to backyard incineration, through the automation of collection and the advent of sanitary landfills, the decade of WTE ascendancy, the maximization of traditional recycling under AB 939, and on to the beginning of the age of sustainability and Zero Waste.

Facets of all these technologies, programs, and policies will play a role in the RENEW LA strategy.

SECTION 3

WHERE WE ARE NOW

INTRODUCTION

The purpose of this section is to highlight where the City of Los Angeles is now regarding the management of its solid resources. Much of the recent landscape has been dominated by measures to comply with AB 939. This section reviews the policies and programs that the City has implemented to meet the 50% diversion goal, and surpass it.

Although not historically framed this way, many of the policies adopted by the City Council, as well as much of what the City Bureau of Sanitation has accomplished, are reflective of first steps toward a Zero Waste goal. This is also true to some extent in what has been accomplished in the private sector in the areas of recycling, greenwaste and foodwaste composting, C&D debris recovery and other programs.

THE REGION

The LA basin, comprised of Los Angeles and Orange counties and western San Bernardino and Riverside counties, disposes of approximately 70,000 TPD of MSW. The table in **Appendix C** lists the name, type, location and permitted capacity of the major facilities used to recycle, transfer, and dispose of this material as well as more outlying facilities that could play future roles as local landfills close. According to the CIWMB's Solid Waste System Information (SWIS) database, the region includes the following facilities and total permitted daily capacities:

- 22 landfills (108,679 TPD)
- 2 waste-to-energy plants (3,240 TPD)
- 40 MRF/transfer stations (83,980 TPD)
- 19 greenwaste processing facilities (12,304 TPD)

The landfills are a mixture of private and public facilities, while the majority of the transfer stations, MRFs, and greenwaste facilities are private operations.

The region as a whole has achieved roughly a 40-50% diversion rate through a combination of curbside recycling, greenwaste composting, C&D processing, mixed ICI material processing, and some would say creative accounting.

In recent years, there has been a growing flow of MSW across county lines to take advantage of unique landfill pricing or to consolidate collection, transfer, and disposal operations within one company.

Several important landfills have closed in the past decade or so, including:

- Spadra (Pomona)
- Lopez Canyon (City of Los Angeles)
- BKK (City of West Covina)
- Bradley West (Sun Valley, estimated closure 2007)
- Miliken (Ontario)

Of particular import to the region, is the planned closure of the biggest daily capacity landfill in the U.S., the Puente Hills Landfill by the year 2013. This could place as much as 13,200 tons per day of MSW searching for other options.

The LACSD has built a 4,400 TPD transfer station to handle some of this material and is planning a rail haul project to its Gold Fields landfill site in the high desert. As of this writing, LACSD has signed agreements with the City of Industry to develop a local intermodal yard and with the Union Pacific Railroad to load and haul up to two 4,000 TPD trains each day for a total of 8,000 TPD rail haul capacity from that location.

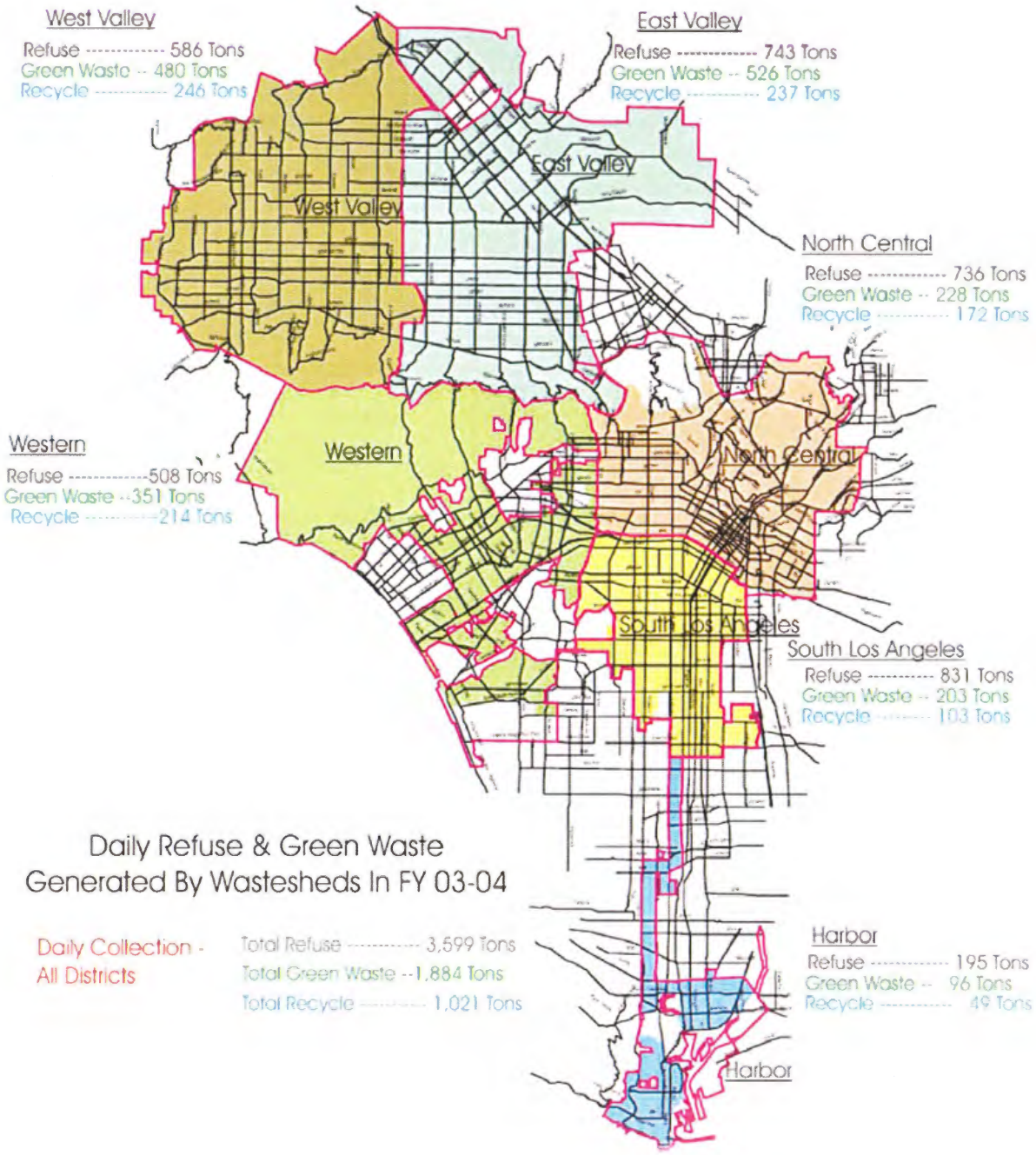
THE CITY OF LOS ANGELES

The City of Los Angeles, encompassing 465 square miles and home to over 3.7 million people, generated a total of 9.3 million tons of material in 2002, diverted 5.8 million of that (62%), and disposed of 3.5 million (38%). The latter represents approximately 14,000 TPD_5 of waste going to landfills from six collection districts. **Figure 3.1** shows the residential refuse, greenwaste, and recyclables generated by these six wastesheds.

In 1994, the City of Los Angeles adopted a goal of reaching 70% diversion by the year 2020. The Bureau of Sanitation has adopted six strategic goals to achieve this:

1. ***Maximize Waste Diversion*** (through continuation and expansion of existing programs, the addition of new materials for recycling, and the creation of new programs)
2. ***Develop Adequate Recycling Facilities*** (through City development or support of the private sector or both)
3. ***Develop Adequate Collection, Transfer, and Disposal of Mixed Solid and Household Hazardous Waste*** (through City development or support of the private sector or both)
4. ***Run an Environmentally Sound Waste Management Operation*** (purchase alternative fuel trucks and modify fuel stations)
5. ***Run a Cost Effective Waste Management Operation*** (maximize diversion at lowest cost)
6. ***Support and Promote Sustainable Development*** (new goal)

FIGURE 3.1
CITY OF LOS ANGELES
REFUSE COLLECTION DISTRICTS



Overall, by pursuing the above strategies, the City of Los Angeles has achieved an outstanding diversion rate of 62% (year 2002 latest available), equivalent to roughly 22,000 TPD_5 (including both City- and private hauler-collected). Although much success has been achieved to date in reaching this diversion level, the ongoing growth in the area, and the continuing increase in per capita generation has resulted in a more or less constant flow of tonnage from the City of Los Angles to local landfills. In other words, the successes in diversion have in essence diverted the increase in generation, but has not reduced the principal.

Table 3.1 summarizes generation, diversion and disposal for the City of Los Angeles for the most recent year records available. Interestingly, the data shows that over 75% of all diversion occurs in the private sector, including both the commercial and C&D wastestreams. Collection, processing, recycling and disposal of material varies by sector, and is described in the following sections in overview.

TABLE 3.1
CITY OF LOS ANGELES
GENERATION, DIVERSION, DISPOSAL[4]
(2002)

SECTOR	TPD [1]		
	Generated	Diverted	Disposed
Public [2]	11,000	5,000	6,000
Private [3]	25,000	17,000	8,000
Total City	36,000	22,000	14,000

(1) Numbers rounded to nearest 1,000 TPD and all normalized for comparison purposes to 5 days per week, even though the private sector operates 6 days per week
(2) Residential single family homes and small multi-family complexes; City departments, and other government facilities
(3) Medium and large multi-family complexes; all other institutional, commercial, industrial facilities; and all construction & demolition material
(4) Data from Bureau of Sanitation

Residential Sector

All waste material from the 580,000 single family homes and the 270,000 multi-family units in apartments or condominiums of 4 units or less is collected by the City of Los Angeles Bureau of Sanitation's fleet of automated, side loading trucks. The material from the 650,000 multi-family units in complexes greater than 4 units is collected by the private sector in open competition.

Figures 3.2 and 3.3 from the Bureau of Sanitation show the composition of residential waste for single family homes and multi-family units respectively.

Single family homes and small multi-family complexes are served by a 3-barrel system in which traditional recyclables are placed in a blue barrel (typically all barrels are 90-120 gallon capacity), greenwaste in a green barrel, and the remaining "trash" in a black barrel. During weekly collection, a separate truck picks up each can.

Blue barrel material is delivered under City contract to one of five privately-operated Material Recovery Facilities (MRFs) for sorting and recycling. The green material is delivered under City contract to the Community Recycling processing facility in Sun Valley where it is cleaned of contamination, ground and shipped to a remote composting operation in Kern County.

Currently, the black can material is hauled to one of the following landfills either directly or through transfer stations: Sunshine Canyon, Calabasas, Puente Hills (through an agreement with LACSD and the South Gate Transfer Station), or Brea (the latter in Orange County). The City has also been actively pursuing the development of transfer stations of their own, and currently owns and operates the Central LA Recycling & Transfer Station.

In early 2005, daily diversion and disposal for the 3-can system in the residential sector showed a 45% diversion rate based on Bureau of Sanitation data:

- Greenwaste (green can): 1,884 TPD_5 (diversion)
- Recyclables (blue can): 1,021 TPD_5 (diversion)
- Residual trash (black can): 3,599 TPD_5 (disposal)

The Bureau of Sanitation also carries out the following programs as part of their Solid Resources Division activities in the residential sector:

- Multi-family Recycling Pilot Program (five contractors; up to 50,000 total units served; two-year test; various programs including blue bag, separate bins, and mixed waste processing, among others)
- Household Hazardous Waste Collection
- Christmas Tree Recycling
- Waste Oil Collection Program
- Backyard Composting and Master Composter workshops
- Waste Audits and composition studies
- Greenwaste processing at Griffith Park, Van Norman, Lopez Canyon, and two Harbor locations (Recreation & Parks also runs a composting facility in Griffith Park as well as a substantial "chip and ship" operation)

FIGURE 3.2
COMPOSITION OF SINGLE FAMILY RESIDENTIAL MATERIAL

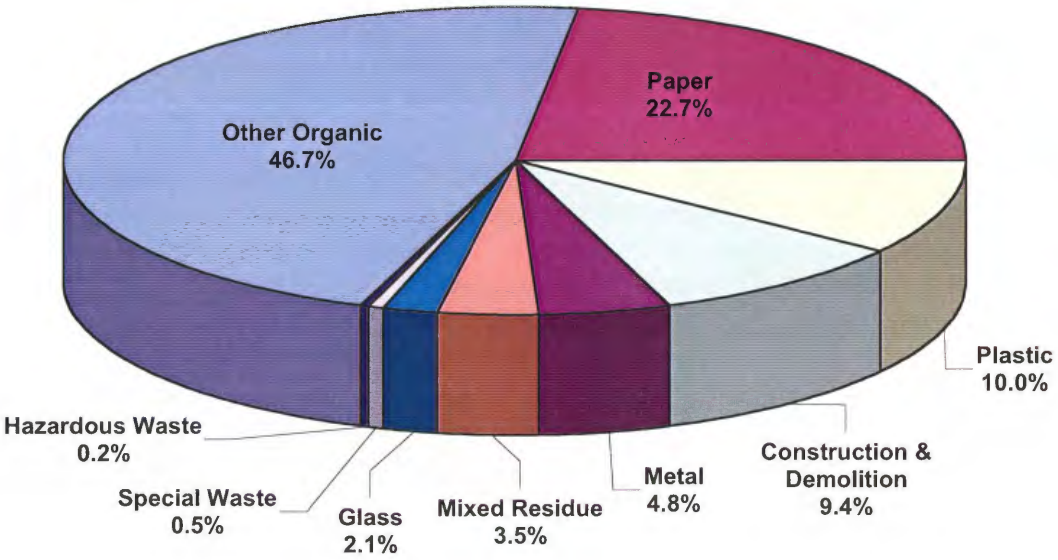
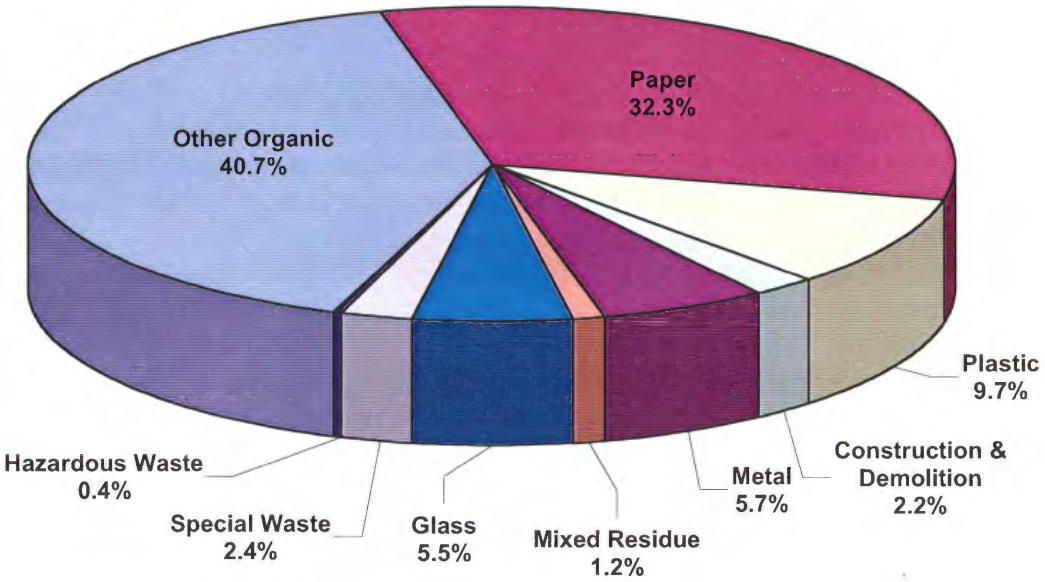


FIGURE 3.3
COMPOSITION OF MULTI-FAMILY RESIDENTIAL WASTE



Commercial Sector

The Bureau of Sanitation collects institutional material from City facilities and other governmental institutions. All other waste in this sector is collected on an open-market competitive basis by private haulers. This material is either direct hauled to local landfills, or is delivered to one of the region's MRFs or transfer stations for processing, transfer, and haul to landfill or recycling markets. Theoretically, this "City of LA generated" material cannot be disposed at any of the LACSD sites due to previous disagreements between the two parties.

Figure 3.4 shows the composition of the commercial material. **Table 3.2** and **Figure 3.5** provide a summary of diversion and disposal in this sector combined with the C&D sector (the only way data was available).

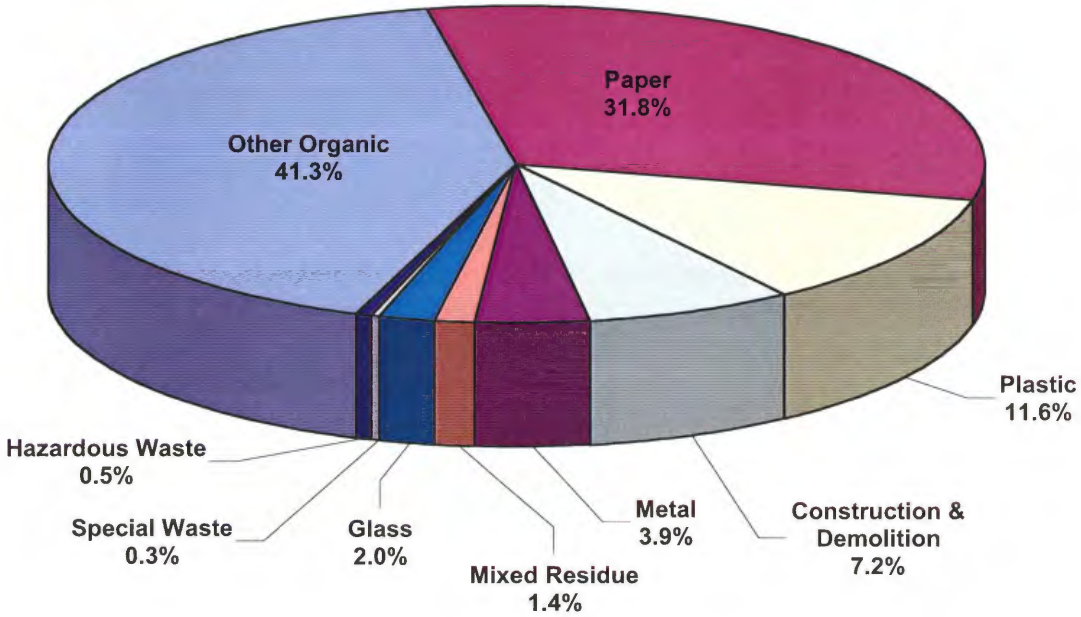
In June 2002, the City Council passed an ordinance establishing a non-exclusive franchise system for private waste haulers in the City. This non-exclusive system allows any waste hauler to be licensed and operate within the City's borders. The requirements for licensing are the payment of a 10% gross receipts franchise fee and the reporting of the hauler's activities, regardless of number of tons of waste collected, including materials collected and disposition of the materials. Haulers that collect under 1,000 tons per year are exempt from the fee. Currently, 140 haulers are permitted to operate in the City. Monies collected from the franchise system are deposited in a special fund to be used only for waste diversion and recycling programs implemented for the multi-family and commercial residents currently receiving private waste hauling services.

Although there is no "mandatory" recycling ordinance for the commercial sector, to increase the incentive to recycle, the City established a rebate system to encourage waste haulers to deliver materials to certified processors, with a fee rebate given for every ton of waste recycled by the facility. Rebates were increased recently to $25 per ton recycled for mixed solid waste. In 2004, a total of over $1.8 million was rebated to 21 haulers via this program in the commercial and C&D sectors.

Private haulers also compete with established recycling firms, who are exempt from the franchise fees if they collect source separated recyclables.

A recent study by the Bureau of Sanitation, Solid Resources Division into the feasibility and impacts of instituting an exclusive franchise system that would require private haulers to implement recycling services and bulky waste collection for their customers found that the system would put many of the current haulers out of business, would increase costs (based on similar franchise systems in other local cities), and may not increase diversion rates.

FIGURE 3.4
COMPOSITION OF COMMERCIAL MATERIAL



Staff recommended the following:

1. continue the current non-exclusive franchise system
2. increase outreach, technical assistance, and incentives to City businesses to reduce and recycle waste
3. through City Enterprise and Recycling Development Zone incentives, support recycling-based business development in Los Angeles
4. increase procurement of recycled content materials to 'close the loop' and create markets for these products
5. do not pursue a hauler franchise as the method to collect all bulky items
6. review the fee rebate allocation annually to maximize the rebate given to waste haulers for recycling activities
7. continue to expand the number of certified recycling processors

Diversion activities are conducted on a open competition basis and are comprised primarily of collection of source-separated material (predominantly cardboard and office paper); and limited MRF processing of select loads of mixed commercial material.

At this time, the Los Angeles area is short on commercial processing capability with only two facilities (Community Recycling and Innovative Waste Control) capable of processing substantial mixed material. City-certified diversion at these two facilities ranges from 4% to 7% as only bulky and easy to retrieve recyclables are captured at this

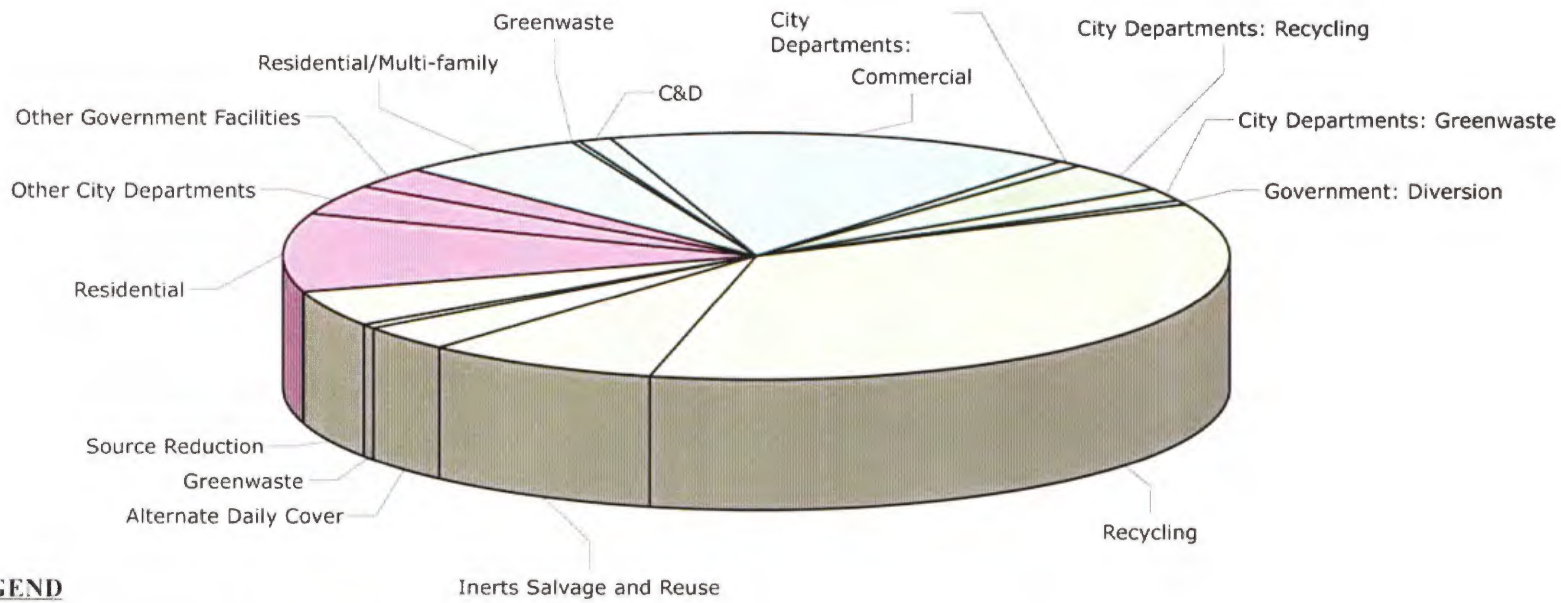
TABLE 3.2
SUMMARY OF DIVERSION AND DISPOSAL
COMMERCIAL AND C&D SECTORS [2]

2002

COMPONENT	ACTIVITY	TPD
Diversion		
Public Sector		
City Departments [1]	Source Reduction	308
City Departments [1]	Recycling	1,308
City Departments [1]	Greenwaste	538
Government	Diversion	154
	Subtotal	2,308
Private Sector		
Recycling		11,923
Inerts Salvage and Reuse		2,692
Alternate Daily Cover		1,154
Greenwaste		169
Source Reduction		1,538
	Subtotal	17,476
Disposal		
Public Sector		
Residential		3,500
Other City Departments		1,300
Other Government Facilities		900
	Subtotal	5,700
Private Sector		
Residential/Multi-family		2,115
Greenwaste		115
C&D		385
Commercial		5,385
	Subtotal	8,000
	TOTAL	**33,484**

(1) Excluding Bureau of Sanitation
(2) Source: Bureau of Sanitation

FIGURE 3.5
SUMMARY OF DIVERSION AND DISPOSAL
COMMERCIAL AND C&D SECTORS



LEGEND

Private Sector Disposal (24%)

Public Sector Disposal (17%)

Private Sector diversion (52)

Public Sector Diversion (7%)

Source: Bureau of Sanitation

time. Several new facilities may need to be developed in the future as well as expansions of the existing facilities to serve this sector, particularly if the City pilot program of "dirty MRFing" of mixed commercial material proves fruitful.

State law enforced by the CIWMB requires full solid waste permits for facilities that process material that: 1) is not source-separated; 2) contains more than 1% putrescibles, or 3) contains more than 10% residuals. The permitting process is arduous and usually requires a full environmental review, public hearings, the securing of a Conditional Use Permit and other plans/approvals. Most facility operators are hesitant to undertake such as expensive, lengthy and uncertain process.

The City is currently sponsoring a two-year pilot program that involves processing mixed commercial waste at two facilities in the City to determine what percent diversion can be achieved. A successful result, perhaps in the 20-30% range could lead to an expansion of the program throughout the commercial sectors of the City.

Community Recycling operates a foodwaste recycling program which currently includes over 1,000 supermarkets and recovered over 18,000 tons of source-separated organics in 2000. This material is processed with the greenwaste at the Community Recycling MRF in Sun Valley and ends up as feedstock at the Company's composting operation in Kern County.

The City of Los Angeles has contracted with Norcal to operate a pilot food waste recovery program for local restaurants. According to staff at the Bureau of Sanitation, 46 restaurants have enrolled in the program to date in which discarded food waste is separated in containers that are collected by the City. In January 2005, 279 tons of foodwaste was collected, and transferred to Community Recycling's composting facility in Lamont, CA (Kern County).

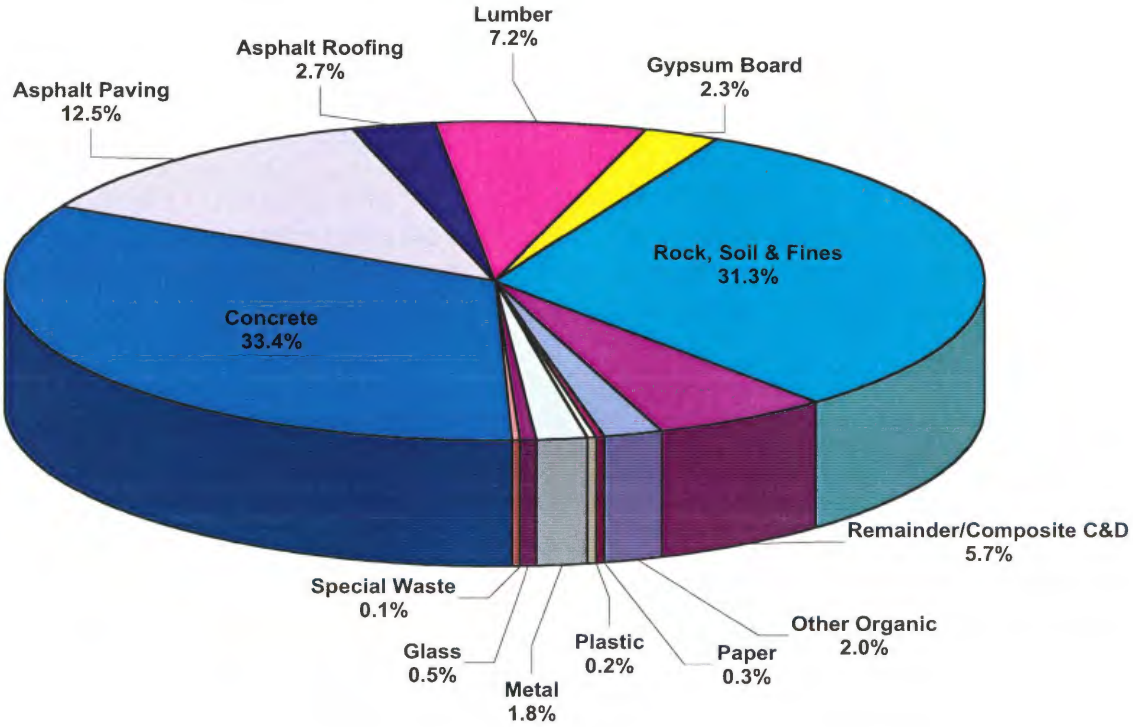
Construction & Demolition Sector

Most cities, and Los Angeles is no exception, are concentrating efforts on diversion programs and facilities for the C&D sector. This is a result of the fact that traditional residential recycling (blue barrel) has peaked, commercial recycling is in its infancy, and existing C&D processing facilities have demonstrated an ability to achieve high diversion (up to 90%) at reasonable cost.

Figure 3.6 shows the composition of the material. **Table 3.2** and **Figure 3.5** shown previously provide a summary of diversion and disposal in this sector combined with the commercial sector.

All waste in this sector is collected on an open-market, competitive basis by City-licensed private haulers. This material is either direct hauled to local landfills, or is delivered to one of the region's C&D processing facilities or transfer stations for processing and haul to landfill or recycling markets.

FIGURE 3.6
COMPOSITION OF C & D MATERIAL



Diversion activities are conducted on a private, open competition basis and are comprised primarily of collection of source-separated material from construction and demolition sites (predominantly wood, concrete and asphalt, roofing material, bulk metal, drywall, cardboard and greenwaste).

In addition, there are 10 City-certified C&D processing facilities serving the City of Los Angeles. These processors and their certified diversion levels are shown in **Appendix K**. Tipping fees range from $35 to $40/ton and diversion credit ranges from 19% to 63%.

There is no "mandatory" recycling ordinance for the C&D sector, although one is in development. The City has established a rebate system to encourage waste haulers to deliver materials to certified processors, with a rebate given for every ton of waste recycled by the facility. Rebates were increased recently to $10 per ton for construction and demolition material recycled. In 2004, a total of over $1.8 million was rebated to 21 haulers via this program in both the commercial and C&D sectors.

The Bureau of Sanitation is currently preparing an ordinance to make C&D recycling mandatory for all City-funded projects (See **Appendix H)**.

C&D processing capacity within the City has increased substantially over the past two years as new facilities have come on line and existing plants have increased their capacity and capability.

Special Waste

The City of Los Angeles has programs and facilities that handle so-called "special wastes" as discussed below.

Bulky Items

The Bureau of Sanitation currently collects at no charge bulky items from residents on a "call in" basis. These items can include appliances, furniture, mattresses, carpeting, wood, toys and other such bulky, hard-to-handle material. In addition, the city operates a bulky item drop-off center at 2649 E. Washington Blvd, where residents can drop off their items free of charge. The drop off center also accepts electronic waste (radios, TVs, stereos, and computers) also called "e-Waste" for recycling.

A supervisor inspects all items and those that are in good condition are donated to local charities (i.e. Salvation Army, St. Vincent de Paul, etc.) where they can be repaired, if needed, and re-sold. Items that are in poor condition are hauled to the landfill for disposal; e-Waste in poor condition is delivered to permitted recycling facilities.

Tires

The City of Los Angeles currently has a Used Tire Recycling Drop-off program. Residents are encouraged to bring their old tires, with a maximum of four passenger tires at any one time, to designated locations throughout the City. At these sites, the tires are loaded into trucks and hauled to tire recycling plants. Through all City programs combined, roughly 1.3 million tires (approximately 13,000 tons) were recycled in 2004, according to the Bureau of Sanitation.

Five businesses at present are listed on the CIWMB and EPA websites as suppliers or manufacturers of products using scrap tires. The most common use of the waste tires is re-treading.

The Rubberized Asphalt Concrete Technology Center (RACTC) is a cooperative effort by the County of Los Angeles, County of Sacramento and the California Integrated Waste Management Board (CIWMB) to promote the use of crumb rubber from scrap tires in roadway rehabilitation projects by providing education, training and consultation services to local agencies within California. The program is funded by the CIWMB in an effort to reduce the State's stockpile of scrap tires and to help conserve the State's landfills.

Los Angeles County has increased the use of rubberized asphalt concrete (RAC) beginning in 1992. Since 1993, the Department of Public Works has completed over 500 lane miles of RAC resurfacing projects using over 1.1 million scrap tires; the Department currently specifies RAC on approximately 75% of their arterial highway resurfacing projects. An additional 50,000 tires have been diverted thanks to the use of rubberized asphalt slurry, which the County has used in over 30 projects involving local streets, and major and secondary highways.

There are currently eight active, permitted waste tire facilities in Los Angeles County.

Biosolids (Organic Waste from Wastewater Treatment)

The City of Los Angeles recovers biosolids from its Hyperion and Terminal Island Wastewater Treatment Plants. Historically, biosolids produced at Hyperion were discharged to the ocean or landfilled. When the discharge of biosolids to the ocean was banned in the 1980s, the City constructed the Carver-Greenfield (C-G) "Four-Stage Multiple Effect" dehydration process, which converted the biosolids to energy. While the C-G process had worked well with food industry effluents, which are reliable and non-abrasive, the process was not compatible with the irregular and abrasive materials found in sewage. Other issues arose which cancelled out the benefits of maintaining the plant and to that end the system was shut down in May 1992. At that point, the City embarked on the land application and composting technologies it continues today.

Approximately 450 million gallons of wastewater are treated per day at the Hyperion plant with roughly 650 wet tons of biosolids produced daily. The biosolids are then either applied directly to farmland as soil amendment or mixed in with green materials to produce compost. The City-owned 4,688-acre farm in Kern County, Green Acres Bio-Farm, uses 99.9% of the City's biosolids. Non-food crops such as wheat, corn, and alfalfa are grown on the farm. The remaining 0.1% of the biosolids is delivered to Griffith Park's Composting facility where it is mixed with greenwaste and zoo manure from the Los Angeles Zoo to create compost. The compost is used on City-owned property for landscaping, sold to farmers, or donated to civic organizations for special projects. The passage of SB 926 (Flores) may prohibit future land application of City of Los Angeles biosolids in Kern County.

Electronic Waste (eWaste)

Electronic waste (most notably TV's, computers, and monitors) has become an environmental issue in California in the last couple of years due to the hazardous nature of the material and the burgeoning amount going to disposal. Currently, the City accepts these items at no charge along with other household electronics (microwaves, radios, etc) at the following bulky item drop-off center on Washington Boulevard and the following "S.A.F.E." (Solvents/Automotive/Flammables/Electronics) centers across the City:

- 2649 E. Washington Blvd., Boyle Heights
- 1400 N. Gaffey Street, San Pedro

- 7660 W. Imperial Highway, Playa del Rey
- 11025 Randall Street, Sun Valley
- 550 Charles E. Young Drive, West Los Angeles

In September 2003, SB 20 (Sher) was signed into law. This Bill represents a significant milestone in California's effort to establish a solution to the emerging problem of toxic electronic waste. Among many things, SB 20 provides market-based incentives for the establishment and financing of a "free and convenient" system for recycling most computer monitors, televisions, and other video devices containing toxic materials. The Bill also prohibits the sale of such devices after 2007, consistent with a phase-out initiated by the European Union.

There are several private companies in the Los Angeles area that deconstruct computers, monitors and TV's either to salvage parts for refurbishing and resale, or for destruction and recycling as elemental material (glass, plastic, metal). Historically, these facilities have charged a fee of roughly $0.10-0.20 per pound for the electronic units; however, SB 20 set up a new program in which special fees assessed at the time of purchase are used to reimburse collectors and processors of eWaste. With this funding ($0.20/lb for collection and $0.28/lb for processing) these companies are able to collect and process TVs and monitors at no charge to the public.

The City also issued an RFP for eWaste recycling in early 2004 and awarded the contract to NexCycle, who recycles all City-owned computers and TV's.

To further encourage the diversion of eWaste, the CIWMB announced a ban on CRTs from landfill disposal starting in 2005, and a similar ban on computers starting in 2006.

Household Hazardous Waste (HHW)

Historically, the City has sponsored roving HHW collection days during which a temporary collection facility (Bureau of Sanitation's Hazmobile) would be set up in a local park or other community area and residents could deliver HHW at no charge. The material would be staged and either reused (in the case of certain types of paint for example), sent to processors for re-manufacturing (used oil for instance), or sent out for disposal at the Kettleman Hills Landfill, or other hazardous waste disposal facility.

In 2004, the City set up permanent HHW collection facilities in San Pedro, Playa del Rey, Sun Valley, West Los Angeles, and Boyle Heights (see S.A.F.E. list above under eWaste). Residents can drop off their HHW at these sites year round. Accepted materials include:

- Car batteries
- Motor oil and antifreeze
- Paint products and solvents
- Household and garden chemicals, pesticides and fertilizers
- Pool cleaners
- Aerosol products

Special Event Recycling

The City has extensive recycling programs at many large venues and offers free special event recycling services. Any community group or other special event promoter can call the General Services Department and receive free recycling bins and service at their events. The City also hosts a huge number of large venues, most with existing recycling programs.

The City of Los Angeles has a section of the General Services Department website devoted to special events recycling. The site details the requirements of AB 939 and provides a contact number for more information and assistance in setting up such a program. The Los Angeles Conservation Corps' "Recycling Across Los Angeles" (RACLA) program employs young people ages 18 to 23 to provide recycling education to the public and CRV beverage container collection services at special public events such as football games, festivals and the LA Marathon. RACLA corps members also provide litter abatement and recycling in high traffic recreation venues such as regional, state and national parks and along major transportation corridors.

On October 29, 2004, Governor Schwarzenegger signed into law AB 2176 (Montanez) regarding waste reduction at large venues and events. By April 1, 2005, the CIWMB is required to make available one or more model local agency programs to facilitate solid waste reduction, reuse, and recycling programs at large venues and events. Each local agency is further required to provide specified information on and after July 1, 2005, to operators of large venues and large events when issuing a permit. As of January 6, 2005 and until January 1, 2008, each local agency is to make an annual report to the CIWMB on the progress of recycling and waste reduction programs at the top 10% of large venues and events.

Recycling at the Port of Los Angeles and LAX

City departments are responsible for choosing, implementing, and reporting on their own recycling programs. The most significant of the these departments are the Port of Los Angeles and LAX.

Port of Los Angeles Recycling Programs

The Port of Los Angeles incorporates innovative environmental ideas in its construction projects. For example, when building an on-dock rail facility, the Port saved nearly $1 million by recycling existing asphalt pavement instead of purchasing new pavement. The Port also maintains an annual contract to crush and recycle broken concrete and asphalt. In addition, the Port has successfully used recycled plastic products, such as fender piles and protective front-row piles, in many container wharf construction projects.

The Port of Los Angeles completed their Pier 400 dredging and landfill project in April 2000; it created deeper channels to allow greater access to the Port. The material

dredged from the channel was "recycled" and used to add nearly 600 acres to the Port to help accommodate an expected doubling of cargo coming through the Port in the next few years.

The Port has also developed an internal recycling program to encourage employees to reduce and prevent waste, save money and maximize resources within the Port's workplace. Office recycling at the Port includes the collection and recycling of everything from white paper to newspapers and magazines, to aluminum and plastic beverage containers. In addition, the Port recycles scrap metal, motor oil, toner cartridges, wood and greenwaste. Tires, and construction and demolition debris are also part of the recycling action. The Port has an outreach program to help Port customers to document and expand their recycling activities.

LAX Recycling Programs

The Los Angeles World Airports (LAWA) operates the LAX Source Reduction and Recycling Program, which has been in effect since 1992. While participation in the program is voluntary, tenants are required to decrease their disposal rates in accordance with AB 939. Tenants may implement self-managed diversion programs or they may participate in LAWA's programs. Should tenants incorporate self-managed programs, they are required to document diversion rates for LAWA on a monthly basis. A LAWA recycling coordinator is available to provide support data and define system modifications to strengthen the materials recovery process.

LAWA recycling programs are as follows:

- Grasscycling (leaving mown grass in place)
- Source Reduction Options: programs developed by generator
- Modified standard lease agreement to require source reduction and recycling.
- Representation in the Citywide Sustainable Design Task Force
- Continued program enhancement though regular inspections, recycling coordinator letters to tenants, program evaluations, staff meetings, and training and technical support.
- Publication of recovery program status and results
- Modified purchasing practices to encourage the use of post-consumer products; bidder must also indicate the post-consumer content of products
- Pallet recovery for targeted generators
- Woodwaste recovery program
- Cardboard recovery program
- Monitoring system
- Tenants are required to designate one employee to serve as recycling coordinator
- Magazine recovery
- Source separation of hand towel in terminals
- Film plastics recovery

- Mixed paper recovery program in terminals
- Wet/dry waste collection
- Food banking
- In-flight separation of dry-cabin cleaning wastes, beverage containers, magazines and polystyrene containers
- Co-mingled source separated container recycling
- Inerts recycling
- Tire recycling

As of 2000, LAX had already achieved a diversion rate of 58.5%. However, during 2004, LAX discontinued many of their recycling programs and is only now beginning to reinstate them.

Education and Public Outreach

For the City of Los Angeles, education and public outreach are the responsibility of the Bureau of Sanitation. They are experienced in developing and implementing such programs including ones to support the roll-out of the three-can curbside recycling system, and new pilot programs in the multi-family, commercial and restaurant foodwaste areas. The Bureau has produced many print and radio advertising campaigns, as well as print material in support of a myriad of programs over the past 15 years.

The key is not the programs themselves or the expertise to develop and carry them out – but rather the funding to pay for them at the level needed to really influence entrenched public behavior.

Admittedly, in recent years the funding for such programs has been extremely limited. As a result, public outreach and education in relation to the residential curbside recycling program has been virtually non-existent, contributing in part to a contamination rate in the blue barrel material of over 30%. With the advent of the 10% gross revenue fee on haulers, more money may be available in the future.

At present, the BOS is running the following programs:

- Advertising on the sides of the collection trucks
- Billboard advertising
- Free composting workshops at the Griffith Park Composting Facility
- A monthly newsletter, *An Environmental Affair*, produced by the Environmental Affairs Department
- Free mulch program
- Garden for Kids LA: City of Los Angeles initiative designed to bring gardens to schools throughout the city.

In addition to the City of Los Angeles, the County of Los Angeles, and the CIWMB sponsor education and outreach programs, which can be summarized as follows:

- School curriculums (K-12): Environmental Ambassador pilot program, Generation Earth, LA County Sanitation Districts Education program, Think

Earth Environmental Education, and the United Education Strategy Grant program
- Defenders of the Earth (assembly performances by costumed characters)
- Smart gardening workshops: residents can learn about composting
- Community recycling events: waste tires, e-waste, household hazardous waste

Recycling Market Development Zone (RMDZ) Program

One of the critical aspects of the recycling system is the re-manufacturing of recycled material into new products and the sale of these products back into the community – so called, "closing the loop". In support, the CIWMB initiated a program several years ago to establish zones (RMDZs) throughout the State in which new industries could locate and receive economic incentives to process and re-manufacture recyclable material, thereby providing jobs, stimulating the local economy, stabilizing markets, and supporting the existing recycling efforts. The entire City of Los Angeles has been designated an RMDZ. At present, there is no master list of recycling industries (companies making products out of recycled or recyclable material).

As discussed in Sections 4 and 5 ("Where Do We Need To Go", and "Getting There") the nurturing and support of a local manufacturing sector is key to the concept of zero waste and represents the "new industrial revolution". This is particularly true when such manufacturing is conducted in an environmentally and humanly conscious way, preserving resources, maximizing recycling, reducing toxicity, and minimizing hazardous emissions, while nurturing our ecosystems.

Source Reduction

The focus of this report is on the handling of MSW once it has been generated. However, an integral aspect of "resource management", is the significant reduction in generation of waste material that would greatly facilitate a zero waste effort. As previously mentioned, even with the diversion levels approaching 50%, many municipalities in California are seeing their landfill tonnages steadying or even escalating. Part of this is due to growth in population and industry, but another important factor is the continual increase in *per capita* generation.

Americans are not only continuing their "throw away" habits, but throwing away more than ever. A fundamental shift is needed in consumption and manufacturing practices so as to reduce the "end of pipe" material that must be recycled or disposed.

To date, source reduction activities have included such activities as:
- double-sided copying
- bulk purchase of commodities to reduce packaging
- reusable shopping bags
- reusable pallets
- email instead of hard copies
- reduction of disposable/one-time use products

However important such source reduction activities are, it is in the manufacturing sector, the virgin material industries (mining, fishing, forestry, oil exploration) that much of the source reduction needs to occur. This work is beyond the scope of this report, but is a vital part of the global picture of Zero Waste and sustainable planetary systems.

Reuse and the Deconstruction Industry

Reuse

Once a waste material has been generated, the next most efficient, cost effective and environmentally sound option is to reuse it. There is a growing movement toward salvage and reuse of items before they ever reach the wastestream including not only the traditional thrift stores (Salvation Army, Goodwill, etc.), but new stores (Urban Ore, ReStore to name a couple) that stock society's discards for resale. These include a variety of items such as: appliances, furniture; lumber, bricks, drywall, plumbing supplies and other building materials; bicycles; electronics; clothing; books; doors; windows; and bathtubs.

Another interesting and successful program in the City of Los Angeles is LA Shares, a non-profit materials reuse program, which takes donations of reusable goods and materials from the local community and redistributes them free of charge. Interested schools and non-profits register online at the LA Shares website and create a 'wish list" of needed items. When a need is matched, the recipient is notified and instructed to either go directly to the donor for pick-up or to one of two area warehouses.

Since its creation in 1991, LA Shares has worked with over 1,000 local companies to give away more than $40 million worth of goods and materials to over 2,500 organizations throughout Los Angeles County. Donations are tax-deductible and also help businesses adhere to AB 939, which requires them to reduce their landfill-bound waste. Registered donors include companies such as American Express, Boeing, Hasbro, Kaiser Permanente, Twentieth Century Fox, UCLA, and Dole Foods among many others. LA Shares accepts donations of office furniture, office equipment, office supplies, computer systems, paper products, miscellaneous personal items, and, of course, money to help support the program's efforts. Donations are given out as needed and as per availability to registered recipients. Many listed recipients are community organizations, prevention groups, family centers, and local schools.

Started as a pilot program for the City of Los Angeles Cultural Affairs Department, LA Shares has turned into an organization recognized by the US Environmental Protection Agency, the White House Task Force on Recycling and the US Department of Housing and Urban Development for its outstanding environmental achievement.

Deconstruction

The fastest growing part of the reuse industry may be the deconstruction of houses and other structures. New companies are being formed specifically for this purpose. The advantage in Southern California is its proximity to Mexico, with its almost insatiable appetite for such construction commodities driving the market and the value of the deconstruction effort.

Increasing value is being placed on the separation of commodities before they enter the "wastestream". It could be said that most material is a "commodity" when isolated (a couch, a tree limb, a book, a pair of shoes, even foodwaste), and only becomes a waste when combined with everything else.

The other intrinsic value of deconstruction and reuse companies is that they provide local jobs, conservation of resources, and environmental protection.

Extended Producer Responsibility

"Extended Producer Responsibility (EPR)" means taking responsibility not only for the manufacture of products but the retrieval, deconstruction and reuse of products and parts. One interesting development has been the expansion into this area by corporate America (Xerox, Hewlett Packard, Dell, Volvo to name a few). Companies are making significant strides in altering manufacturing practices to conserve resources and energy, reduce toxicity, reduce waste and maximize product recyclability. One key discovery related to EPR has been the fact that it yields profits. It is good business to recycle and reuse. Doing a good thing for the environment has turned into good business sense. This of course is the ultimate driver, and intuitively the way it should be.

EPR is an exciting wave of the future that must be encouraged and even mandated at the Federal level, if necessary. A whole new consulting industry is evolving to advise corporations in this regard.

Recent City of Los Angeles Policies

Future systems of collection, processing, diversion, conversion and disposal are being shaped by decisions being made today. Two of the most significant related to the City of Los Angeles are:

- The 70% diversion mandate. In 1994, the City Council approved the increase in the City's targeted diversion rate from 50% to 70%. This has spawned the development of recycling pilot programs in the untapped multi-family and commercial sectors, the certification of C&D processors and other programs beyond traditional curbside recycling

- Implementation of the10% gross revenue fee on licensed haulers. This has raised substantial and much needed funding specifically earmarked for the Bureau of Sanitation's AB939 diversion programs.

TRUCK HAUL TO LANDFILLS OUTSIDE LOS ANGELES

Historically, there has been some precedent for truck haul and disposal of City of Los Angeles-collected MSW at landfills outside the City proper. For example, for several years up to 1,000 TPD has been transferred from the City-owned and operated Central Los Angeles Recycling and Transfer Station (CLARTS) to the Brea Landfill in Orange County under an import agreement between the City and the County of Orange to take advantage of excess capacity and competitive tipping fees.

Currently, MSW generated within the City of Los Angeles is being hauled by the City fleet and private company collection or transfer trucks to a variety of landfills in Los Angeles and Orange Counties. In fact, according the CIWMB AB 939 data, over 30 landfills report receiving waste from the City of Los Angeles. The most significant of these are:

- Bradley Landfill (WMI)
- Simi Valley (WMI)
- Sunshine Canyon (BFI)
- Chiquita Canyon (Republic)
- Calabasas (the City's West Valley MSW only)
- Puente Hills (via the LACSD South Gate transfer station only)
- Lancaster (WMI)
- Palmdale (WMI)
- Brea (Orange County)

In 2004, Mayor Hahn carried long haul and disposal to a new level when he issued a directive that proposed an end to the disposal of City-collected waste in any landfill within the boundaries of the City of Los Angeles starting in July 2006. Most important of these is BFI's Sunshine Canyon Landfill with whom the City has an agreement to dispose of up to 4,000 TPD through June 2006, with two five-year options to extend that contract. The Mayor's directive in essence would have terminated this contract at the end of the initial period.

Following through on the Mayor's directive, in the fall of 2004, The Bureau of Sanitation requested bids for the transfer, long haul and disposal at landfills outside the City of the 4,000 TPD of City-collected MSW. However, at the time of this writing, Waste Management, Inc. (WMI) the selected vendor has withdrawn its bid due to time delays and possibly the opposition of LA County Supervisor Mike Antonovich and local officials representing the cities with the landfills that would have received the transferred waste.

Nonetheless, transfer and long haul of City-collected waste is a feasible scenario for the future.

RAIL HAUL TO DISTANT LANDFILLS

For over 20 years, rail haul has been hailed as the future paradigm in Los Angeles regional waste management. In fact, other regions of the U.S., most notably, the Pacific Northwest, have already embarked on large-scale rail haul operations. Historically, as local landfills near capacity, it has been the natural progression to reach out to more distant sites in remote areas, including the high desert.

In the LA area where air quality and traffic congestion carry perhaps the greatest impact on our daily lives, trucking to these remote sites seems an inferior solution at best – thus the advent of rail haul with emissions roughly one-third those of trucking, and traffic congestion almost non-existent except at grade crossings.

The opportunity exists to load shipping containers and utilize the existing intermodal rail infrastructure to rail haul MSW to more distant landfill sites in Riverside, San Bernardino, Imperial, and San Diego counties, or even beyond to Arizona, Nevada or Utah. Most often mentioned in this regard are the Mesquite Regional and Eagle Mountain landfills in the high desert in San Bernardino County. The former has been purchased by the LACSD and is fully permitted, requiring only construction of intermodal rail facilities at the landfill to be ready to receive MSW. LACSD is also trying to purchase the Eagle Mountain landfill, although litigation has held up that sale. Other landfills mentioned in regard to rail haul from Los Angeles include among others: ACDC in Utah, Lockwood in Nevada, and Copper Mountain and La Paz in Arizona.

CSDLA has constructed a 4,400 TPD MRF/transfer station adjacent to the Puente Hills landfill that is planned as the first rail haul facility in southern California. LACSD has signed an agreement with the City of Industry to develop a local intermodal yard (with direct access to the transfer station) and the Union Pacific Railroad to load and haul up to two 4,000 TPD trains per day from that location. Per the mandates in the last Puente Hills landfill permit expansion, LACSD must have the first rail served landfill on line by the end of 2008 and the first train running by the end of 2009.

Outside of the LACSD facility, the plan for rail haul in the rest of the Los Angeles area calls for existing transfer stations to be retrofitted with compactors for loading shipping containers. The weight of these containers would be limited to legal axle load limits. The full containers will then be shuttled by truck to existing intermodal yards in Vernon, Commerce, the City of Industry, or Colton where cranes would transfer the containers to the rail cars. The double stacked container cars would then be hauled by locomotives to the remote landfill sites.

There are no transfer stations in the basin, with the exception of the LACSD Puente Hills facility, with an onsite or immediately adjacent intermodal yard that would allow the loading of containers and placement directly on rail cars without the restrictive over-

the-road haul. (The LACSD transfer station may be connected directly to the intermodal yard by a special tunnel that would not restrict axle weights).

However, the one exception may be the City-owned CLARTS facility. The City could purchase adjacent property for its own intermodal yard. Alternatively, if a variance could be obtained for crossing Washington Blvd., heavy containers above the legal axle load limit and up to 30 tons per container could be shuttled across the street from CLARTS into the BNSF intermodal yard, resulting in significant rail haul savings as the railroads charge per container, not per ton. Clearly, this would require a major contract commitment from the railroad, and dedication of a portion of their operation at that yard to the CLARTS rail haul project. As discussed below, this could be problematic.

One recent turn of events has cast a potential cloud over future MSW rail operations. With the boom in trade and the continuing buildout of the Los Angeles and Long Beach harbors, the local intermodal system has been taxed beyond all projections. The railroads are already straining to keep up with demand, and in some cases have fallen significantly behind schedule. There is some question as to whether the existing intermodal yards will be able to, or will even be interested in, transferring hundreds of additional containers each day loaded on trains headed for the desert. In fact, there is even some question about the carrying capacity of the mainline tracks themselves. If this situation persists, it could have a crippling effect on rail haul plans for MSW, beyond the LACSD operation at Puente Hills.

THE COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY

Beyond the rail haul discussed above, mention needs to be made of the significant role played by LACSD in the management of MSW in the Los Angeles region. LACSD is a quasi-governmental agency comprised of 78 cities in Los Angeles County, which owns and operates the following facilities in the region:

- the Puente Hills Landfill (permitted at 13,200 TPD until 2013)
- the Calabasas Landfill (permitted at 3,500 TPD)
- the Puente Hills Material Recovery Facility and Transfer Station (permitted at 4,400 TPD with rail haul capability)
- the Southgate Transfer Station (permitted at 1,000 TPD)
- the Downey Area Recycling and Transfer station (DART permitted at 5,000 TPD)
- the Commerce Waste-to-Energy plant (permitted at 1,000 TPD)
- the Southeast Resource Recovery Facility (SERRF permitted at 2,240 TPD and jointly owned with the City of Long Beach)
- the Mesquite Regional Landfill (permitted at 20,000 TPD and in development for rail haul waste in the high desert near the Salton Sea)

Although the City of Los Angeles and LACSD have had disputes in the distant past, the possibility for future cooperation exists as the City moves forward on the road to Zero Waste. However, the LACSD by its very nature is averse to innovation and risk, and

therefore will likely not be in the vanguard of change to a new paradigm; and as discussed above has already committed to a large rail-haul transfer station and landfill. However, once the initial CT plants are on line and operating successfully, it is quite possible that LACSD could be a formidable ally in the accelerated development of the entire system supporting the goals of sustainability, environmental stewardship, and Zero Waste.

THE CAILFORNIA INTEGRATED WASTE MANAGEMENT BOARD (CIWMB)

Formed in 1972, the CIWMB oversees and regulates all aspects of MSW, HHW, C&D, eWaste, tires and other waste streams in the State of California. Of most import to this report and the future of resource management in the City of Los Angeles are the Board's research, regulation, programs and policies in the following areas: Zero Waste, Conversion Technologies, Tiered Permitting, and AB 939 Diversion Credits.

Zero Waste

In 2004, the CIWMB embraced a Zero Waste goal. This is extremely important in that is sets the context and future partnership for cities within the State to do likewise – and in fact, that is what this plan recommends.

On their website, the CIWMB says,

> *"The Board promotes a zero waste California in partnership with local government, industry, and the public. This means managing the estimated 76 million tons of waste generated each year by reducing waste whenever possible, promoting the management of all materials to their highest and best use, and protecting public health and safety and the environment."*

> *"Zero Waste is based on the concept that wasting resources is inefficient and that efficient use of our natural resources is what we should work to achieve. It requires that we maximize our existing recycling and reuse efforts, while ensuring that products are designed for the environment and have the potential to be repaired, reused, or recycled."*

Conversion Technologies

Recognizing the potentially critical role of conversion technologies in a Zero Waste paradigm, the CIWMB funded a two year effort to study conversion technologies, their performance, reliability and overall feasibility here in California; their economics; and their potential impacts on our existing recycling infrastructure. The CIWMB staff prepared a summary document entitled, "Conversion Technologies Report to Legislature" in which Board staff concluded:

> *"Based on the peer reviewed information from the Evaluation of Conversion Technology Processes and Product prepared by UC Riverside, the Life Cycle and Market Impact Assessment of Non-combustion Waste Conversion Technologies prepared by RTI*

International and reports from other organizations, alternative thermochemical and biochemical conversion technologies may be technically viable options for the conversion of post recycled MSW and offer better solutions to landfilling and transformation."

Tiered Permitting and Regulation

The CIWMB has established a tiered permitting structure in which, in general, the larger and more impactful the facility, the more comprehensive the permit required. This permitting covers: MRFs, transfer stations, landfills, waste-to-energy plants, composting sites, and all the programs for special wastes (tires, eWaste, foodwaste, etc.).

Of critical import here is the proposed future permitting and regulation of conversion technologies within the tiered system. At present, anaerobic digestion will be permitted under the composting tier and the others under the transfer station tier. There is ongoing debate at present from stakeholders that conversion technologies should not be permitted or regulated at all by the CIWMB, because the pre-processed material going in to them is an industrial "feedstock" not MSW. Under this interpretation, a conversion technology would be no different than a paper mill or glass bottle manufacturing plant, making conversion technologies much easier to site, permit and develop.

AB 939 and Diversion Credit

The CIWMB is proposing regulations regarding conversion technologies and diversion credit, namely, should any credit be given and if so, how much? The draft regulations would grant diversion credit for anaerobic digestion, but only a maximum of 10% of a jurisdiction's total diversion. Gasification, fermentation and other conversion technologies would receive no credit.

This subject too, is being hotly debated by stakeholders, environmentalists and the CIWMB. The key issue is "highest and best use" of material, with the traditional environmentalists claiming that conversion to energy is not the highest and best use. CT advocates argue that these processes are taking only the material left *after* existing recycling programs and facilities and that this additional diversion should count with no limit. The author of this plan is one of the foremost proponents of this philosophy and has lobbied the CIWMB and the State Legislature in support.

Again, the CIWMB decision will be critical in supporting or dampening the development of conversion technologies. Cities need diversion and will be hesitant to pursue the innovative CTs if that diversion will not count. Several bills that would facilitate development of CT plants, including assignment of diversion credit are in process in Sacramento including: AB 1090 (Matthews) and AB 177 (Bogh).

COMING EVENTS

Several events are approaching that could have a profound effect on the existing system of collection, transfer, recycling and disposal in the LA area. Some of these are as follows:

- Closure of the Bradley Landfill (tentatively scheduled for 2007). This facility is important in the local MSW scene in that it is a local disposal site with a daily permitted capacity of 10,000 tons, although it currently receives far less. Waste Management, the owner of the site, is proposing a 43 ft vertical expansion of the site (an additional two years of capacity) and the development of a 7,000 TPD MRF/transfer station on site to replace the landfill upon its closure. The project is controversial in the local community and is presently in the midst of its permitting effort and EIR preparation. If the transfer station is not approved, a large block of tonnage that formerly went to the landfill will need to be diverted elsewhere. On the other hand, if the project is approved, it will provide significant transfer capability for the East San Fernando Valley area.

- Closure of the Puente Hills Landfill (2013). Although still eight years in the future, this single closure will have a profound effect on the MSW system for the LA region. Permitted at 13,200 TPD, the closure of this site will drive a large block of tonnage back to the open market. LACSD has constructed a MRF/transfer station to help replace some of this capacity but it is capped at 4,400 TPD. The pending closure of this site is the catalyst for initiation of rail haul. The single greatest impediment to new technologies and programs in the area has been the low tipping fee at the Puente Hills landfill. When that cheap disposal is depleted, and rail haul costs come in at $60-$70 per ton, CT and other solutions will become very competitive even at a simple "gate fee" level.

- Initiation of rail haul. When the LACSD completes the rail infrastructure at the Mesquite Landfill and initiates intermodal rail haul with a 4,000 TPD train per day in late 2009, it could signal either the beginning of a major shift to rail haul throughout the basin, or a shift to conversion technology that could offer local economic, environmental and public health benefits. Perhaps there will be a combination of both systems.

- Multi-Family and Commercial Pilot Programs. Should the programs prove a success, and the City make the commitment to City-wide expansion, a significant leap in diversion toward the 70% and Zero Waste goals could be possible. Issues of logistics, processing capability and cost are sure to be in the forefront.

- Franchise Commercial Collection. The Bureau of Sanitation has mentioned the possibility of franchising commercial collection to gain control over recycling programs in these sectors. However, a recent study by the Bureau of Sanitation noted that diversion in the commercial sector is relatively high and should increase as disposal costs rise and the City rebate program continues to pick up steam. In addition, the report favors continuation of the open competition system because an exclusive franchise system would put most of the City's private haulers out of business, and increase collection rates to multi-family residents and businesses. Instead of an exclusive franchise system, Bureau staff recommends that the City:
    - Continue with the current non-exclusive franchise system
    - Increase outreach, technical assistance, and incentives to City businesses to reduce and recycle
    - Support recycling-based business development through City Enterprise and Recycling Development Zone incentives
    - Increase procurement of recycled content materials to 'close the loop' and create markets for these products
    - Not pursue a hauler franchise method to collect bulky items
    - Review the fee rebate allocation annually to maximize the rebate given to waste haulers for recycling activities
    - Continue to expand the number of certified recycling processors

- Expansion of the Sunshine Canyon Landfill. The recent approval of the expansion of this site provides a local landfill with major capacity (permitted 12,100 TPD). The ability of the site to offer "cheap" landfill disposal, although beneficial at first glance, masks other social, environmental, and economic costs as discussed in Section 6.

SECTION 4

WHERE WE NEED TO GO
(the Vision)

"Some people see things as they are and say why? I dream of things that never were and say why not?

Robert Kennedy

INTRODUCTION

We live in an unprecedented time of opportunity. The opportunity to create a new paradigm in resource management and the concept of "zero waste".

This new order of things is not about sacrifice, but opportunity. Not about doing with less, but doing more with what we already have – and in the process creating a new "home-grown" economy right here in LA. It is about "***RENEW LA***" – **R**ecovering **E**nergy, **N**atural Resources, and **E**conomic Benefit from **W**aste for **L**os **A**ngeles.

The industrial revolution, that started 300 years ago with Thomas Newcomen's steam engine pumping water out of English coal mines, has carried some people and countries to an unprecedented standard of living, but at a severe price to the planet, its ecosystems, flora and fauna, and indeed some of its peoples.

As detailed in the seminal book by Paul Hawken, and Amory and Hunter Lovins entitled "Natural Capitalism – Creating the Next Industrial Revolution":

> *"Besides climate, the changes in the biosphere are widespread. In the past half-century, the world has lost a fourth of its topsoil and a third of its forest cover. At present rate of destruction, we will lose 70% of the world's coral reefs in our lifetime...In the past three decades, one-third of the planet's resources have been consumed. We are losing freshwater ecosystems at the rate of 6% per year, marine ecosystems by 4% per year."*

It is clear that our "one way" model of natural resource extraction, manufacturing, one-time use, and disposal must change to one that "mimics" the biological systems in nature. These systems of continuous, closed-loop cycles return resources to the system for reuse, recycling or conversion.

In fact, we must not only reduce the amount of waste we generate and the environmental problems it creates, but eliminate the *concept* of waste altogether. This, in

essence, is the paradigm shift suggested in this report and upon which the "blueprint" is based. To make such a shift requires the curiosity of an open mind, the courage to transcend the status quo, and the tenacity to initiate a new order of things.

THE OLD PARADIGM

The qualities of our existing industrial paradigm are as follows:

- *Maximize production*: to create the greatest amount of product per unit of work
- *Subsidize resource extraction*: to encourage the "mining" of virgin resources as a society by a series of depletion allowance, tax credits, etc.
- *Subsidize waste disposal*: to assist industry (and encourage wasteful practices as a result) by paying as a society for disposal of manufactured products
- *Build in obsolescence*: to encourage the continuous, growing consumption of resources by creating products with short lives
- *Opt for the lowest cost solution*: bury resources in the ground as "waste"
- *Avoid full-cost accounting*: ignore environmental, social, and quality of life issues in making assessments on the "cost" of alternatives

THE NEW PARADIGM

What would be the qualities of a proposed paradigm of "zero waste and the creation of a new home-grown industry"? A list of the most important could be as follows:

- *Sustainability*
- *Responsibility*
- *Protection of the environment*
- *Conservation of Resources*
- *Renewability*
- *Economic Stewardship*
- *Fairness*
- *Leadership*
- *Vision*
- *Education and Outreach*

Each of these qualities is discussed briefly below.

Sustainability

Webster's: to keep in existence; maintain or prolong; to provide sustenance or nourishment; to support from below

This is the new catch word of the environmental movement and rightfully so. It reflects a goal of bringing our systems into balance so that the earth retains its ability to assimilate our materials and create new natural resources on a healthy, long-term,

ongoing basis – in fact, forever. The purpose here is to emulate the continuous closed cycles in nature that have been self-sustaining since the beginning of time.

Responsibility

Webster's: the condition or quality of being responsible; accountability; dependability; obligation

This quality applies not only to our individual actions, but to those as a society and planet as well – to the "common areas" of air, water and land. It asks each of us to be accountable for what we create, to not merely shunt the problem off to another location, another people, another generation; and to do so in a way that facilitates sustainability. In Los Angeles, this means looking for local solutions rather than longer and longer hauling of waste to other jurisdictions.

Protection (of the Environment)

Webster's: to shield from injury, danger, or loss; guard; defend

No matter the level of our success, or our socio-economic standard of living, all will ultimately be lost unless we protect the very ecosystems (air, fresh water, forests, etc.) upon which we rely for the oxygen we breathe, the food we eat, the shelter we create, and all of life's functions.

Conservation (of Resources)

Webster's: protection from loss, waste, etc.; preservation

In a finite world with finite resources, it makes infinite sense to carefully husband the resources we consume to ensure a balance between extraction and replenishment.

Renewability

Webster's: the quality of being made new or as if new again; to replace as if by a fresh supply

The way to maximize a finite supply of resources is to develop systems and facilities based on renewable materials and energy, that can be used over and over again as opposed to maximizing the use of "non-renewable" resources such as fossil fuel. In this way, we can develop an unprecedented standard of living for all people on the planet. Without the focus on renewable technologies, the natural resources of the earth will be depleted. The economic growth of China, India and other countries place an additional burden on existing resources – remembering that it is the U.S. that consumes 25% of the earth's resources with only 5% of its people.

Fairness (Environmental Justice)

Webster's: the quality of being just and honest; impartial; unprejudiced

Environmental Justice is a new concept based on the historical fact that certain communities (generally lower income and ethnic) tend to carry more than their share of impactful land uses such as prisons, wastewater treatment plants, landfills, and polluting industries. Much of this is driven by existing zoning ordinances that restrict such uses to heavy industrial areas where lower income neighborhoods often co-locate. A more desirable ethic is to create an equitable distribution of facilities and for all communities to share in both the beneficial services and also the impacts.

Coincident with this fairness doctrine must be the development of better technology and better environmental controls leading to minimized impacts. This will ease community acceptance of such projects. In Los Angeles, the areas that have carried the burden to date are the harbor, south central Los Angeles, and the North and East San Fernando Valley.

(Economic) Stewardship

Webster's: ***the act of being morally responsible for the careful use of money, time, talents, or other resources, especially with respect to the principles or needs of a community or group***

Our assessment of competing paradigms (waste disposal vs. resource management for example) must now take into account all the benefits and costs, including not just the traditional "bottom line" reflecting the cheapest piecemeal solution, but rather all the social, environmental, and quality of life issues that are so important. Evaluation on such a scale can produce a much different outcome, and lead to more educated choices.

Leadership

Webster's: ***the quality or act of leading; directing; commanding, or guiding head, as of a group or activity***

As one of the pre-eminent cities of the 21st century, and one perfectly positioned on the Pacific Rim with direct trade routes to all of the western Pacific countries for exchange of goods and services, Los Angeles must continue its heritage as a leader of new trends and ideas. This is our opportunity to lead the rest of the country into the new paradigm of resource management.

Vision

Webster's: ***the ability to perceive something not actually visible, as through mental acuteness or keen foresight***

In order to lead, one must have vision, be able to see ahead what others don't, be able to not just rearrange the cars on the train, but to get out in front of the locomotive and lay new track. Without such vision and the ability to articulate it clearly and with passion, we are doomed to succumb to the protectors of the status quo and to continue our existing outmoded systems until it is too late to change.

Education

Webster's: ***the process of training and developing the knowledge, skill, mind, character***

To succeed where our vision leads will require education of our leaders, the solid waste and recycling industry, and ourselves as individuals and communities.

EXISTING ELEMENTS OF THE VISION

Over the past 15 years, the City of Los Angeles has made significant and accomplished strides both in the public and private sector toward a zero waste system, even though it wasn't officially called that. Most notably, the City has achieved a

diversion rate of 62% and is targeting the next push to reach the self-imposed mandate of 70% by 2020.

Indeed, the Bureau of Sanitation "Solid ***Waste*** Management Department's" recent name change to "Solid ***Resource*** Management Department" signals the exact paradigm shift being called for here. Their "Phase IV Report – Solid Waste Management Policy Plan" of October 1993 laid out the strong beginnings of the vision discussed here over 10 years ago. This Plan was updated in 2000 with a Solid Resources Infrastructure Strategy Facilities Plan and again in 2001 with Strategic Recommendations for Meeting the Year 2020 70% Diversion Goal. Now it is up to us to carry on from there with renewed commitment and urgency.

In the private sector, companies continue to develop new MRFs, C&D processing facilities, composting sites and other facilities and programs in spite of the difficulty in permitting such projects in an area booming with development.

City leaders are calling for major increases in recycling and the closing of local landfills. Indeed, the closure of the City's Lopez Canyon Landfill and the imminent closure of the Bradley Landfill in Sun Valley illustrate this trend.

The CIWMB has embraced a Zero Waste philosophy, leading the way toward the new vision. The Board says on their website:

> *"The success of Zero Waste requires that we redefine the concept of "waste" in our society. In the past, waste was considered a natural by-product of our culture. Now, it is time to recognize that proper resource management, not waste management, is at the heart of reducing waste sent to landfills.*
>
> *For years, we have been throwing valuable resources away—the same resources we will inevitably need in the future—all in the name of consumer and manufacturer convenience.*
>
> *At the California Integrated Waste Management Board (CIWMB), we now embrace the idea of a Zero Waste California as we promote the goals of market development, recycled product procurement; provide recycled purchase opportunities through our RecycleStore, and continue to research new and sustainable technologies.*

These bold statements are right on purpose with this new blueprint for the City of Los Angeles.

Regarding renewable energy, the LADWP has inaugurated an aggressive Renewable Portfolio Standard (RPS) calling for 13% renewable energy by 2010 and 20% by 2017, a truly ambitious goal and also one in line with the new paradigm. In fact, the new conversion technologies form a nexus between the solid waste industry and the utilities in

that they "convert" portions of our wastestreams into renewable energy; thus creating both waste diversion and green energy.

THE VISION (in a nutshell)

Although a perfect world can never be achieved, we must act in our hopes for the future, as if we could. Following are the transformations this plan supports:

- *Virgin resource extraction*: individuals and companies performing the "mining" of virgin resources (oil, minerals, timber, fish, corn, etc.) do so in a manner that not only protects the ecosystem's ability to sustain itself, but improves that capability

- *Manufacturing:* Manufacturers take on the mantle of "Extended Producer Responsibility", embracing the idea of cradle-to-cradle production in which they bear responsibility for their products in a closed cycle of production, use, recovery and conversion back to new products. As such, they realize it is good business to minimize virgin resource use, to eliminate the creation of toxic and hazardous material, to maximize the reuse and recyclability of their products, to minimize packaging and other material that must be handled at the "end of the pipe". This may involve a shift in concept from manufacturers of "products" to providers of "service", in which they will take responsibility for the complete, closed-loop handling of their manufactured goods.

- *Reduce:* Individuals, communities, and companies reduce the amount of material consumed in the first place. This will require a shift from our "more is better" philosophy of conspicuous consumption.

- *Reuse:* Once products have been manufactured and used, society will maximize the reuse of these items and embrace the concept that "pre-owned" is good, including encouragement of stores that sell re-usable hardware, building supplies, and other items.

- *Recycle:* And finally, for that material that cannot be reduced or reused, society will recycle it into some other product and thus contribute to sustainability, renewable, resource conservation and the other positive qualities the paradigm espouses. This "recycling" also includes composting, which is the recycling of organic material into soil conditioners, and fertilizers. Recycling will involve a combination of source-separation (where recyclables are separated at the home or business and collected separately) and processing of mixed material at MRFs.

- *Conversion:* Once a material has reached the point where even recycling is no longer feasible, which will be predominantly organic material, new "conversion" technologies (gasification, anaerobic digestion, fermentation,

etc.) will be used to convert the biomass to fuels, chemicals or energy and usable by-products. This energy is not only "green" and "renewable", but can also result in net zero greenhouse gas emissions.

- *Residual Repository:* Ideally, there would be no waste, and therefore, no need for disposal. However, an acceptable target is the transformation of landfills into "retrievable, inert residual repositories" that would accept 10% or less of the current daily tonnage in the form of non-polluting, stabilized, inert material. In addition, this material would be so placed as to be easily extractable and re-manufacturable when future technologies or market forces make it feasible. Ultimately, this mining of retrievable resource would provide the last step in the achieving of a zero waste system.

- *Home-Grown Industry:* New entrepreneurial businesses will spring up in conjunction with elevated levels of material recovery, spawning a revitalized manufacturing sector in the City of Los Angeles. These jobs will be associated with the processing, recycling, composting, conversion and re-manufacturing of resources heretofore buried in the landfill. These companies will tend to be small in size and universally distributed throughout the City. A recent CIWMB report to the SCAG Solid Waste Task Force (Berton, February 7, 2005) highlighted the need for developing "home-grown infrastructure and markets,

  > *"Exports of paper and plastics, particularly to China, have increased over the past five years. This trend may change dramatically as China's internal recycling system matures. If that is the case, then California's recycling infrastructure may not be able to adequately recover and we will not be able to handle the increase in feedstock should the export market collapse. California needs to keep its resources within California and develop internal infrastructure and markets to sustain them."*

- *Buy-Recycled:* To "close the loop" and drive local industry, the government sector will lead the way in mandating the preferential purchase of products with post-consumer recyclable content. This also involves the shift as a society from favoring new 'virgin material' products to the acceptance and support of the purchase of products with recycled material content. See Appendix V for a draft of a new City of Los Angeles Procurement Policy that supports not only recycled content products, but highest and best use of resources.

GOAL AND TIMETABLE

This plan targets the reduction and eventual elimination of landfill disposal of waste, as known today. Annual disposal tonnage is easy to obtain because all material generated within the boundaries of the City of Los Angeles and delivered to landfills is weighed on certified scales and the numbers reported to both the City Environmental Affairs Department and the CIWMB for AB939 compliance calculations.

Therefore, the measurable goal to be achieved by this blueprint for resource management is to achieve a 90% diversion rate or greater, reflected in the following schedule of disposal tonnage (See Chapter 5 for details):

Year	Material to Disposal (TPY)	Diversion %
2005	14 million (current number)	62
2010	13 million	68
2015	10 million	77
2020	7 million	87
2025	4 million (inert retrievable)	93

It is important to note that this diversion includes not only the existing material going to disposal, but a 2% growth per year in the wastestream, which adds thousands of tons per day that must also be diverted in the future.

Achieving this goal through the implementation of this blueprint will automatically result in the achievement of the ancillary goals of creation of new, quality jobs in the local manufacturing sector, reduction of environmental impacts, and the easing of traffic congestion by reduction in long-distance truck hauling.

SHIFT IN GOALS

One of the key aspects of any paradigm shift is the focus on new goals. AB939 changed the paradigm in 1989 in the State of California from a priority on the cheapest and easiest means of disposal to one of diverting 50% by 2000 regardless of the cost. The Los Angeles City Council provided a further shift in the paradigm by declaring a 70% diversion target in 1994.

Now, a similar shift to zero waste must be created. New technologies and programs must be evaluated in the light of the new goal, the new paradigm. This is not to shrug off the mandate for fiscal responsibility, but to say that this responsibility must be viewed in a new light where the target is a sustainable system based on resource recovery, and highest and best use of those resources, not a "one-way' system based on the irretrievable disposal of waste.

SECTION 5

GETTING THERE
(the Blueprint)

"The best way to predict the future is to invent it."
Alan Kay
(conceived idea for the laptop computer)

INTRODUCTION

This Resource Management Blueprint puts forth a vision of what could be created in the City of Los Angeles by 2025, and the means of getting there. This section lays out the "blueprint", the design of the structure capable of getting us ultimately to a sustainable, zero waste city.

It is important to remember that this is a process and a long one at that. This blueprint will require ongoing work, refinement, and course corrections along the way. This is not, as they say, "set in concrete", but a living plan that requires nourishment, vision, and most of all persistence to stay the course.

There are definite recommendations for plans and facilities in this "blueprint". However, it is also important that we eliminate the concept of waste and begin to think in continuously renewable cycles of resources and products. Certainly this won't happen overnight, but it could happen within a decade, or two.

This blueprint builds on work completed over the past 15 years or more by our local officials and the Bureau of Sanitation and its consultants, including policies, programs and facilities developed in the original AB 939 Source Reduction and Recycling Element and its updates, and more recent work on policies and facilities needs. In addition, the blueprint borrows from the best programs and plans from other jurisdictions in California, across the U.S., in Europe and other countries around the world.

Of all the mega-cities in the world, Los Angeles with its 62% diversion rate is among the leaders. From the public sector side, we can boast of a fully-implemented residential curbside recycling program for both traditional recyclables and greenwaste, pilot programs launched for the multi-family and commercial sectors, rebate programs to encourage haulers to deliver MSW and C&D to processing facilities, a 10% franchise fee on all hauler gross receipts to fund ongoing diversion projects and programs, and S.A.F.E. centers for drop-off of Household Hazardous Waste (HHW) and e-Waste.

In addition, as discussed in Section 3, even with all the public sector programs, the private sector commercial material and C&D debris recycling efforts provide the bulk of city-wide diversion. This has been achieved through programs of source-separation as well as mixed material processing.

This being said, it is still critical to note that although the City's diversion rate has continued to climb resulting in the current reduction, reuse, recycling, and composting of over a million tons of material a year, since 1990, the City of Los Angeles has landfilled about the same quantity of waste each year - 3.5 million tons. This represents roughly one ton of waste disposed per year for every man, woman and child in the City.

In other words, all the tonnage reductions achieved by our AB 939 programs to date have been neutralized by increases in per capita generation and the overall growth in population and commerce in the City. Thus, in pure terms related to the minimization of waste disposed at landfills, we are right where we started 15 years ago.

Clearly, our efforts to date, although commendable, are not enough. This blueprint lays out the new paradigm that will take us over the next decades to a true zero waste society.

OVERVIEW

The focus of this blueprint is on the portion of the City of Los Angeles' total wastestream still going to landfill disposal. Roughly 40% of this disposal is collected by City forces from the single family homes and institutions, and 60% is collected by private haulers predominantly from multi-family complexes, commercial businesses, and industry.

To reach our ultimate target of "Zero Waste", meaning only a small amount of stable, inert material is placed in landfills, the City must develop or support the programs and facilities to process and divert the vast bulk of our wastestream. In addition, the City must enact the policies to support that new diversion infrastructure, and the education programs to both train the population in proper practices and educate today's youth so they are equipped to carry on this plan over the next 20 years and beyond – and hopefully "raise the bar" even further.

The focus of this section is on the main MSW stream, not "special wastes" such as tires, eWaste, biosolids, and HHW. Although proper management of these materials is important, programs and infrastructure are essentially in place to handle and recycle them, and more controls and mandated recycling is continuing to occur from the Federal level on down in these areas.

In order for us to free ourselves from a disposal-based system, this plan attacks the big ticket item – our trash, and treats it as a resource to be collected, reused, processed,

recycled, converted and otherwise returned to the manufacturing sector and society as products, fuels, or renewable energy.

To a great extent, this will be accomplished by intensified processing of both source-separated and mixed wastestreams coupled with conversion technology (CT).

TECHNOLOGY

This section summarizes the physical system, the facilities, that will be needed to achieve the zero waste objective within 20 years.

COMPONENTS OF THE SYSTEM

The new blueprint is a combination of existing systems, structures and programs that will be intensified in the future; and new CT facilities. More discussion will follow in the section describing the actual system for each wastestream. The following are the most significant existing programs and facilities that will be continued and intensified.

Residential Sector

Single Family

- 3-can curbside recycling program (adding food to the greenwaste can)
- Backyard composting
- Mulching lawn mowers

Multi-Family

- Source separation pilot programs escalating to full scale
- Mixed waste processing at MRFs

Self-Haul

- Diversion of loads to chip & grind, MRFs, or C&D processing facilities

Commercial Sector

- Wet/dry routing
- Source separation
- Mixed material processing at MRFs
- Supermarket food waste recycling
- Restaurant, bar and hotel glass and foodwaste recycling
- Special event recycling
- LAX and Port of LA source separation and recycling

C&D Sector

- Deconstruction
- Source separation at the job site
- Mixed material processing at C&D facilities

A note is needed here on the concept of Inert Residual Repositories as a new form of landfill. Progressively over the next 20 years, the implementation of enhanced source separation programs and the development of mixed waste MRFs, autoclave systems and CT facilities will change the character of the waste material requiring landfill disposal. Increasingly, the organics will be removed, resulting in a more stable, inert residue that is benign in the environment and suitable for landfilling. Our goal is to achieve diversion levels such that this residue is roughly 10% or less of the tonnage being generated.

CONVERSION TECHNOLOGIES (CT)

Conversion Technologies are the new element in the 20-year plan for the City of Los Angeles. It is their ability to take the residual organic material remaining after our best efforts at reduction, reuse, recycling, MRF processing, and other traditional diversion programs, and convert most of it to beneficial and renewable, green energy, fuels, chemicals, compost and other feedstocks for manufacturing.

Because CT is relatively unknown in the U.S., an overview discussion is included here. At present, there are no commercial plants in N. America, with the exception of MSW composting, although two autoclave systems are nearing completion of construction in Anaheim, CA and Minneapolis, MN. However, several jurisdictions are evaluating CT projects including: the City of Los Angeles; the County of Los Angeles (Local Task Force); County of Riverside; the Sacramento Municipal Utility District (SMUD); Middletown, NY; Grove City, OH; and others.

This section is based on the current knowledge of the conversion technology industry, and recent requests for qualifications and proposals from cities and counties in California, including Los Angeles. These provide insight into real world responses by CT companies for potential projects in Southern California.

For a much more detailed evaluation of the technologies themselves, their performance, cost, environmental characteristics, etc., the reader is referred to the recent report by CIWMB staff "Conversion Technologies Report to Legislature" and the supporting documents "The Evaluation of Conversion Technology Processes and Products" prepared by UC Riverside[26], and "Life Cycle and Market Impact Assessment of Non-combustion Waste Conversion Technologies" prepared by RTI International[27].

An RFQ competition conducted by URS Consultants on behalf of the City of Los Angeles (to be completed in the summer of 2005) will provide detailed analysis of the various companies and their technologies. This will lead to the development of an RFP for the first CT plant in the City of Los Angeles.

In this section, conversion technologies that could make ***an appreciable*** impact in the future on the amount of waste destined for landfills in the City of Los Angeles are discussed. Even though there may be feasible and important *niche* type technologies,

dealing with small quantities of waste or specific types of wastes, these were not evaluated because they will have little impact on systemic decision making.

Therefore, the followed assumptions guided the review of alternative technologies:

- Technologies should deal with the bulk of the mixed, post-MRF MSW wastestream, not specialty items alone such as tires or plastic.
- The technologies should be capable of handling large quantities of material in a continuous process (500 TPD per facility, or more)
- Technologies should be targeted only to waste still going to disposal rather than source-separated materials being successfully handled with traditional recycling/composting programs (i.e. commingled single-stream material). This is in keeping with recently proposed CT guidelines from the CIWMB.
- Technologies that involve modified landfill operations (balefills, landfill bioreactors) are not covered by this assessment.
- The focus is on technologies that are beyond the R&D phase and approaching commercialization or already in operation at full scale.

Waste-to-Energy (a special note)

With over 100 plants burning approximately 15% of the nation's trash and generating 2,750 megawatts of electricity, WTE is clearly in a different mode than the other technologies. In some parts of the U.S., most notably New England and Florida, WTE plays a *dominant* role, and in many other states (31 in total), a *significant* role in waste disposal. However, in California, there are only three WTE plants (Commerce, SERRF, and Stanislaus County), and no new facilities are planned. It is unlikely that WTE will play a key role in Los Angeles in the future because:

- In air-sensitive Southern California, incineration of MSW is difficult to justify to the public or the SCAQMD, for that matter
- Previous WTE projects, most notably LANCER and Irwindale failed to get off the drawing boards
- Decades old negative impressions of environmental impacts and public health issues continue in this part of the U.S.
- With deregulation of the power industry, the lucrative energy contracts awarded by utilities in the 1980's are no longer available.

That being said, recent and continual upgrading of WTE technology, particularly in air emissions control, have mitigated some of the previous environmental problems. For example, recent data from the Integrated Waste Services Association (representing the WTE industry) shows that the use of activated carbon as MACT (Maximum Achievable Control Technology) has achieved reduction in Mercury emission of over 90% and of dioxin and furans of over 99%.

These advances plus the proven performance of the plants over decades of operation would indicated that WTE should not be ruled out summarily for future application.

Table 5.1 provides a partial list of CT vendors active as of 2003, based on a listing by Santa Barbara County with recent additions by the authors. **Appendix D** provides a summary listing of conversion technology vendors, their plant locations, feedstocks, and capacities. Data was gathered on each technology with a focus on the status of commercialization; i.e. the development of full-scale facilities.

The Major CTs

Although several of the technologies could contribute in the future depending on further developments in technology and economics, based on worldwide performance and operating history, five technologies currently offer the most promise for the City of Los Angeles:

- Gasification/Pyrolysis
- Anaerobic Digestion
- MSW Composting
- Autoclaving
- Fermentation

Although most of the existing CT plants in Europe and Japan are of smaller capacity, each is essentially of "modular" design meaning they can easily be expanded by adding modules (typically in the 200 TPD range each). Thus, these plants have the capability to handle large volumes of MSW (500-3,000 TPD per plant), including the residue from MRF/transfer stations.

The recent Request for Proposals (RFP) competition in Santa Barbara County produced 49 companies active in the alternative technology industry, 14 proposals, and ultimately a shortlist of seven firms. Based on the proposals, the County developed the following description of a generic project:

- Approximately 80% (160,000 tons per year) of all MSW tons processed would be diverted from the landfill.
- Approximately 35% (70,000 tons per year) are recyclables captured by an up-front MRF and sent to traditional recycling markets.
- Approximately 45% (90,000 tons per year) are organic materials converted to "green" energy which is a locally sustainable resource.
- The resulting landfill diversion creates long-term disposal scenarios that would otherwise be unavailable (e.g. the projected 15-year life/capacity of Tajiguas Landfill would be transformed to 50+ years).
- The cost of conversion (an average of approximately $25/ton) is competitive with existing ($35/ton) and future (circa $80/ton) disposal/landfill costs.
- A conversion facility would require only a fraction of the land necessary for a landfill.

TABLE 5.1
LIST OF CONVERSION TECHNOLOGY VENDORS (*)

GASIFICATION / PYROLYSIS	American Plasma Corp.
	BAV Umwelttechnik
	BRI
	Brightstar Environmental, Inc.
	CR&R (Renewable Resources Alliance, LLC)
	Doug Blackburn
	Compact Power Ltd
	Costich Company
	Down Stream Systems, Inc.
	Eco Electric Power Company
	Energy Products of Idaho (EPI)
	Future Energy Resources Corp.
	Global Energy Solutions
	International Combustion Systems, Inc.
	International Environmental Solutions
	Interstate Waste Technologies
	JF Ventures Ltd
	Lurgi Energie und Entsorgung GmbH
	MEI Power corp.
	Precision Energy Services
	UA Plasma
	Recovered Energy, Inc.
	RGR Ambiente Srl
	Scientific Utilization, Inc.
	Startech
	The Biosphere Process
	Thermogenics, Inc.
BIO-REFINING or FERMENTATION	Arkenol, Inc.
	BC International Corp.
	BRI
	Filter Tech. Corp.
	Genahol, Inc.
	Masada Oxynol LLC
ANAEROBIC COMPOSTING	Arrow Bio, LLC
	BioConverter Park, LLC
	BioMil AB
	Organic Waste Systems (DRANCO)
	Canada Compost, Inc. (BTA)
	CITEC Group
	EcoCorp (Linde-KCA/BRV)
	Farmatic Biotech Energy AG
	Kompogas
	Onsite Power Systems
	Schwarting Unwelttechnik GmbH
	Waste Recovery Systems, Inc.(Steinmuller/Valorga)
MSW COMPOSTING	Bedminster
	Engineered Compost Systems (ECS)
	Herhof Umwelttechnik GmbH
	IPS (US Filter)
OTHER	Comprehensive Resource Recovery & Reuse (CR3)
	ReCulture Engineering
	World Waste International (WWI)
(*) based on Santa Barbara Co., "Alternatives to Disposal	Final Report September 22, 2003"

- While approximately 20% of all tons processed by a conversion facility must be landfilled, this waste would be converted into an inert state, which would significantly reduce operational costs associated with handling putrescible material and potential long-term environmental risks and associated liabilities at the landfill
- A conversion facility could not only power its own process, but produce "green" electricity thereby contributing toward the achievement of California's renewable portfolio requirements and supporting local sustainability.

Each of the five major CT processes is described below. **Appendix D** provides information on some of the major CT vendors and their facilities with facility pictures for visual reference.

Based on results from the URS study for the City of Los Angeles and experience related to MSW composting and autoclaving, the commercial status of each of the CTs is estimated as follows:

Technology	% Commercialized
Gasification/Pyrolysis	100
Anaerobic Digestion	100
MSW Composting	100
Autoclaving	80
Fermentation	40

As shown, anaerobic digestion, gasification/pyrolysis and MSW composting have all achieved full commercialization, with autoclaving at 80% with two plants in construction in the U.S., and fermentation at 40% commercialized; the latter having no plants in operation yet.

Gasification/Pyrolysis

This technology involves the thermal conversion of organic material to synthetic gas or syngas (high percentage of methane), a small volume of ash, and water. The core of the technology is the thermal conversion unit with the product gas used to generate steam or electricity. See **Figure 5.1** for a schematic diagram of the process.

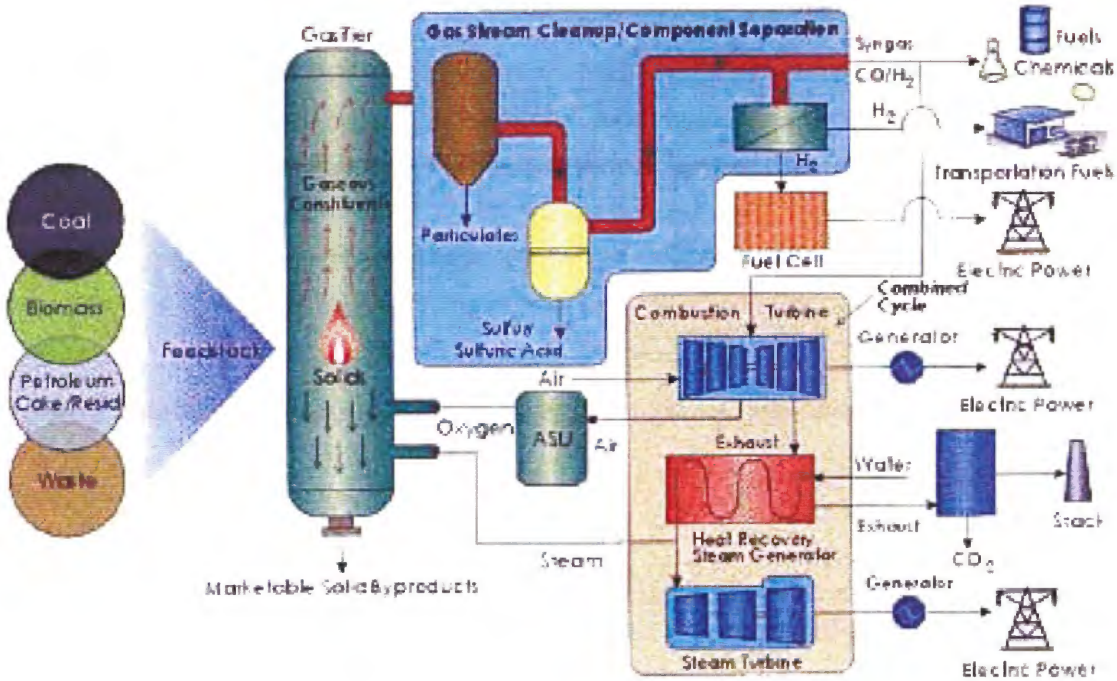
There are dozens of companies worldwide marketing gasification or pyrolysis technology. The greatest concentration of such plants in the world is in Japan where lack of landfill space and high disposal costs have driven them to seek more advanced solutions. According to CIWMB research, over 50 plants in Japan have installed capacity of more than 2.5 million TPY, equivalent to roughly 100% of the biomass going to landfill from the City of Los Angeles.

The focus of this technology to date in the U.S. has been on the conversion of select streams of material such as wood waste, chipped tires, or coal. However, there are several companies that include MSW as a target feedstock.

FIGURE 5.1

Gasification

Use of heat, pressure and steam to convert organic material directly to a synthetic gas (CO + H), oils, and char.



Typical Feedstocks: **Coal**
Coke
Wood
MSW

Principal Product: **Energy**

Source: CIWMB

In particular, gasification generates low air emissions, and achieves high rates of conversion leaving an ash residue of only 10-15% by weight of the incoming material, or less. The process generally requires a Refuse-Derived-Fuel (RDF) feedstock (vs. mixed MSW), and a landfill for disposal of ash.

Results of data gathering as part of the CIWMB study[26], showed that the current gasification plants in Japan and Europe are capable of meeting all the air emission standards that a plant in Los Angeles would be required to meet. These results would be examined in detail in the Environmental Impact Report (EIR) that would be prepared as part of the CEQA and Conditional Use Permit process for a CT facility in Los Angeles.

A key concern regarding the commercialization of the technology is the high capital and operating costs for the complex systems. This, coupled with the relatively low price of energy, means that the net tipping fee is likely to range from $40-$50 per ton.

Another issue is the public acceptability of a thermal process, regardless of how low the air emissions. The environmental community has come out in general against gasification because it is seen as another form of incineration, although clearly, it is not since it is "non-combustion". Regardless of current fact, fears of toxic air emissions persist and will likely only be allayed once and for all when a first plant is built in Los Angeles and the emissions rigorously tested. As previously mentioned, the Japanese and European plants are continuously monitored and have already passed similar and more stringent tests.

In addition, air emissions testing has just been completed at the International Environmental Solutions (IES) 50 TPD pyrolysis plant near Riverside, CA. Initial results indicate emissions below stringent South Coast Air Quality Management District (SCAQMD) limits.

Interestingly, gasification can be used as the front end of a bio-refinery to produce gas for conversion to ethanol. Thermogenics of Albuquerque, NM; Biomass Systems of San Leandro, CA; and BRI Energy are currently working on such systems that tout very high and efficient conversion to ethanol.

Plasma Arc Gasification is a variation of the gasification technology that is well established in the metals industry, and is being adapted to handle MSW. Initial applications have been for hard-to-handle material such as hazardous and radioactive waste. The in-vessel process involves the high-temperature "melting" of waste into gases and vitrified residue. The former can be used for power generation; the latter for aggregate, bricks and tile. Small demonstration plants have been constructed for testing various waste applications. Some gasification technologies are evaluating plasma arc as the front end of their systems.

Anaerobic Digestion

Anaerobic Digestion is the bacterial breakdown of organic material in the absence of oxygen. The process produces methane gas, which can be used for heat and/or power generation; and a solid residual that is typically composted into a soil amendment. See **Figure 5.2** for a schematic diagram of the process.

Anaerobic Digestion is one of the fastest growing CTs in the world. The greatest concentration of facilities is in Western Europe where a combination of market drivers is stimulating development of new plants in Belgium, Germany, Holland, Spain, Italy, France and other locations. According to the CIWMB report to the legislature, over 80 AD plants have a total installed capacity of 2.8 million TPY, equivalent to over 100% of the total biomass going to landfill from the City of Los Angeles.

Anaerobic Digestion is also being used extensively in the dairy industry to process cow manure and generate electricity for farms. Although small in size (most are for individual farms or collectives) the number and success of these projects is noteworthy and proves performance and cost effectiveness, at least in that agricultural arena. With a substantial horse population in the San Fernando Valley, this option has potential here in Los Angeles.

The application of importance here is the digestion of the organic fraction of MSW. There are scores of such plants operating throughout Europe, but as yet only one in N. America, and that only a demonstration plant in Toronto.

There are several potent and successful European firms with dozens of operating plants between them, who are actively pursuing projects in the European Union countries. They include, among others:

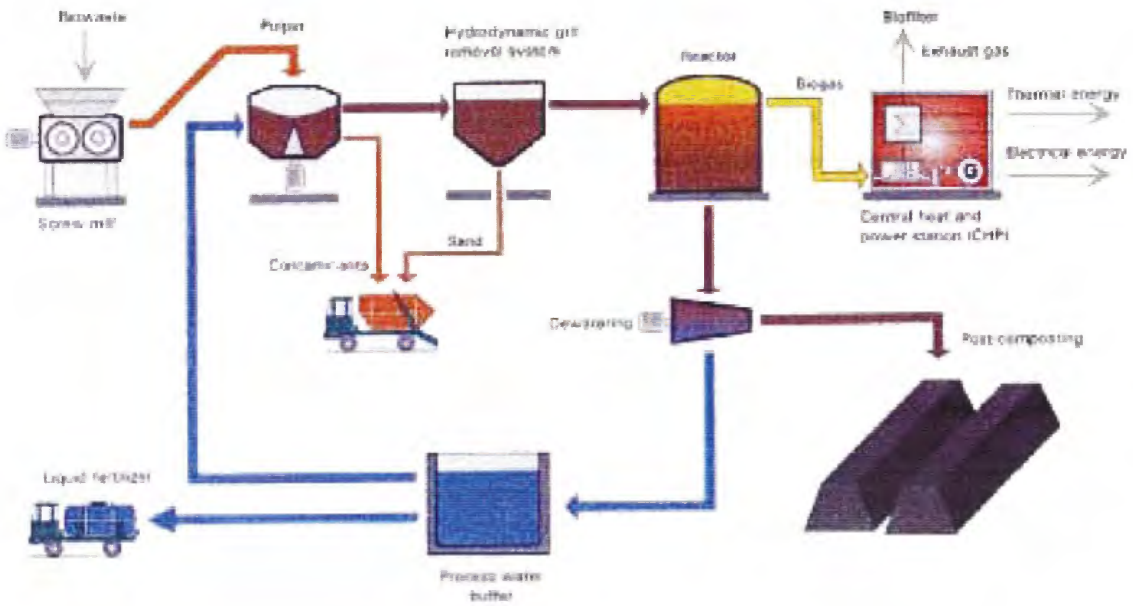
- OWS – Organic Waste Systems (Belgium)
- BTA (Germany)
- Steinmuller/Valorga (Germany and France)
- Linde (Sweden)
- Kompogas (Switzerland)
- Arrow Bio (Israel)

There are also three N. American companies with projects in development related to MSW; Onsite Power Systems; BioConverter Park, LLC; and Halton Recycling, Inc.

FIGURE 5.2

Anaerobic Digestion

The bacteria breakdown of organic material in the absence of oxygen to produce methane.



Typical Feedstocks: **Biosolids**
Livestock Manure
Greenwaste
MSW

Principal Products: **Energy**

Source: CIWMB

Onsite Power Systems is in the process of developing a large demonstration plant at UC Davis with the intent of translating that design and operating experience into the development of a 200 TPD greenwaste digestion facility for Cal State Channel Islands University. BioConverter has recently signed development contracts with the City of Lancaster for a 200 TPD greenwaste project, and the City of Los Angeles for a 2,700 TPD greenwaste facility. The latter included a guaranteed power purchase agreement from the City of Los Angeles DWP at $0.049/kWh.

The Sacramento Municipal Utility District (SMUD) is working with BLT Enterprises, Inc. and the City of Sacramento to install a 250 TPD OWS anaerobic digestion facility processing greenwaste, foodwaste, and low grade paper at BLT's Sacramento Recycling and Transfer Station. If developed, the plant will generate 1.25 MW of renewable electricity for SMUD's RPS program, or alternatively could pipe the biogas directly to SMUD's nearby generating station.

Canada Composting, Inc. (CCI) of Ontario constructed a full-scale, commercial anaerobic digestion plant processing MSW feedstock in Newmarket, Ontario. The 650 TPD plant utilizing the German BTA process, was the first of its kind in North America. Feedstock included foodwaste, greenwaste, and mixed residential trash. A patented hydro-pulper was used to separate organics from inorganics. The latter was sorted for recycling, and the former fed into the two-stage digestors. The high quality, low sulfur gas produced was engine ready, requiring no clean up. Residuals from the digestors were sold in bulk for soil amendment on golf courses and farms. The methane gas generated in the digestors was to be used in a co-gen plant to generate electricity to run the plant and export to the grid. With a reasonable capital cost of $25 million, tipping fee of approximately $38 per ton, this technology seemed poised for success. Unfortunately, a series of setbacks kept the plant from achieving full promise, and the plant was shuttered in 2003. It has since been re-designed and re-opened by Halton Recycling of Newmarket, Ontario. In addition, a second, smaller CCI plant is still in operation by the City of Toronto.

Key projects to monitor:

- **Halton Recycling, Inc., Newmarket, Ontario:** 100 TPD MSW and source separated organics
- **Onsite Power Systems, Camarillo, CA:** 200 TPD greenwaste to power
- **BLT / OWS Anaerobic Digestion, Sacramento, CA:** 250 TPD greenwaste, foodwaste and wastepaper to gas or power

MSW Composting

The fourth promising CT is the only one commercialized in the U.S., namely the in-vessel composting of MSW. The technology features controlled oxygen, moisture, and temperature environments to accelerate the decomposition of organics. Each in-vessel stage is generally followed by a curing stage, which is either an aerated-static pile, or traditional windrow. There are four firms currently pursuing projects in the U.S.

Bedminster has now developed 10 projects worldwide, six in the U.S., all handling mixed MSW and biosolids. Although their flagship Cobb County, GA plant experienced operational problems, it is now operating properly. New plants have come on line in the past few years, including the 700 TPD (designed to handle over 1,000 TPD) facility in Edmonton, Alberta. The company is now licensing the technology to others for project development.

The Bedminster system is designed to handle MSW and biosolids together, usually a 2:1 mix. It is not designed to run on MSW alone.

Conporec is a French-Canadian company with a front-end technology similar to Bedminster. Their one operating North American plant is located north of Montreal in Tracy, Quebec, and processes 35,000 TPY of mixed MSW (everything except Blue Box recyclables). They have also been awarded a 38,000 TPY facility in Delaware County, Delaware to process a mix of MSW and biosolids.

Herhof is a European technology with roughly 50 installations there. Historically, the Herhof system has focused on source-separated organics as a feedstock for production of compost. A more recent thrust has been the processing of MSW for the production of Stabilite, their patented Refuse-Derived-Fuel (RDF) that is sold to WTE and conventional power plants. The company is proposing a modified system to process MSW and produce compost and Stabilite. Their one North American facility, in Peele, Ontario (outside Toronto) processes 16,000 TPY of mixed MSW for sale as compost.

ECS (Engineered Compost Systems) operates a 50 TPD MSW composting facility at West Yellowstone, MT, and is constructing another 50 TPD MSW composting plant for Mariposa County, CA. The latter system will feature an upfront MRF followed by eight composting vessels for primary composting and an aerated static pile (ASP) system for extended curing.

See **Figure 5.3** for a schematic diagram of a typical MSW composting operation.

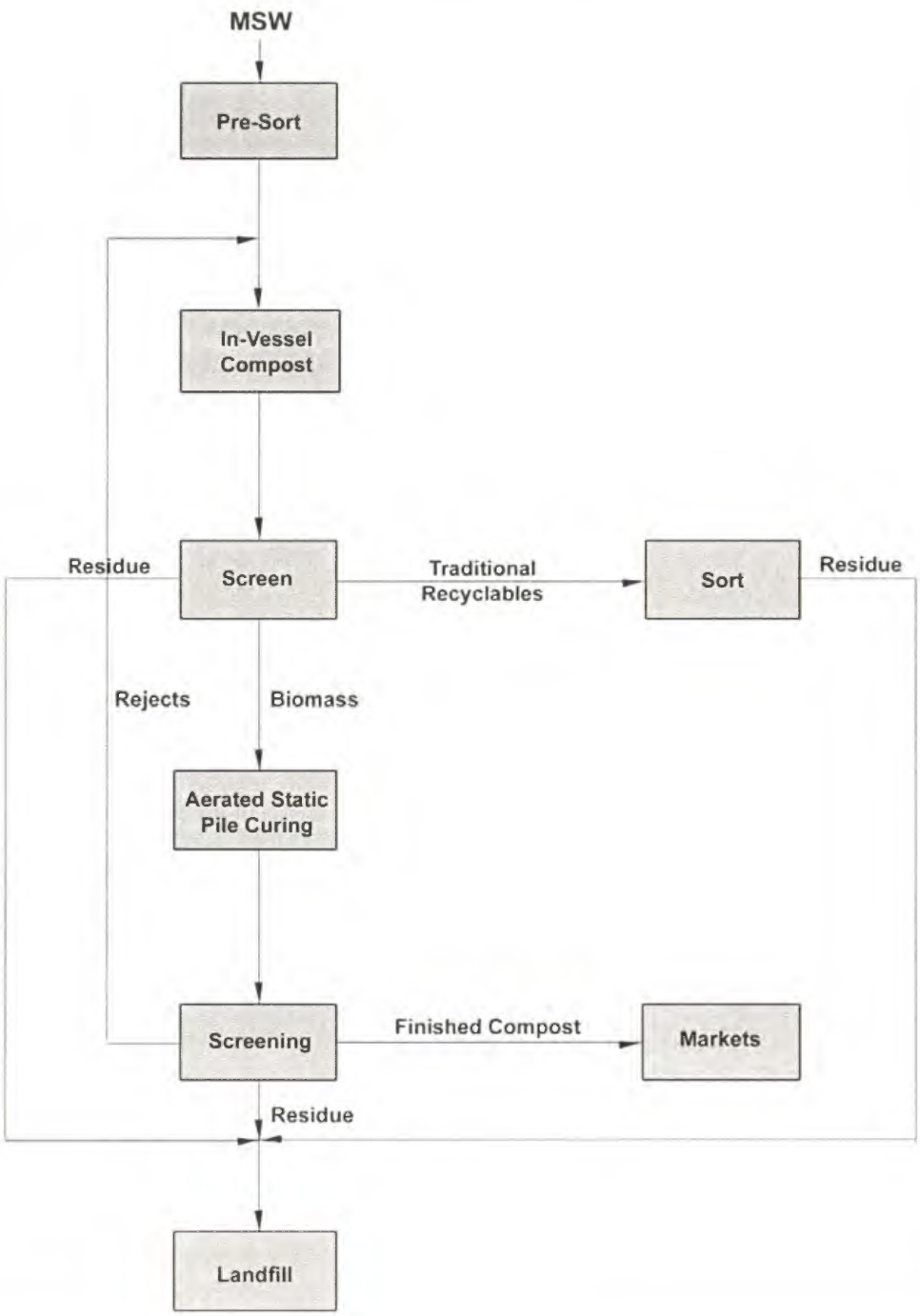
Key projects to monitor:

- **Bedminster, Edmonton, Alberta**: 700 TPD, largest MSW composting plant in North America
- **Bedminster, Cobb County, GA**: 300 TPD, operating flagship plant
- **Herhof, Peele, Ontario**: 16,000 TPY MSW plant, operational
- **Conporec, Tracy, Quebec**: 35,000 TPY MSW, operational
- **ECS, Mariposa County, CA**: 15,000 TPY MSW

The outstanding questions regarding MSW composting are the quality and marketability of the final product, and the overall cost. It is realistic to assume that MSW composting facilities will come with tipping fees in the $50 per ton range or more. This net cost is strongly impacted by the cost of residue disposal and the value and marketability of the finished compost.

FIGURE 5.3

MSW COMPOSTING



Autoclaving

Autoclaving of medical waste for sterilization before disposal has long been practiced throughout the U.S. However, this plan highlights a much broader, larger, and innovative process in which mixed residential and commercial MSW or post-MRF residue is "pressure cooked" with steam in large, rotating super drums up to 25 ft in diameter and 100 ft long. This facilitates subsequent separation of organic material (paper, cardboard, foodwaste, etc.) from inorganic (glass, metal, plastic, textiles, etc.).

As shown in **Figure 5.4,** the process involves the following steps:

- Autoclaving of "as received" or "post MRF" MSW (no shredding or pre-processing is necessary except removal of bulky items)
- Screening
- Sorting of traditional recyclables (and textiles if markets exist)
- Paper fiber cleaning (the two proprietary processes on the market vary in the degree of cleaning and following processes. WWI performs only preliminary cleaning, while CR3 performs a comprehensive cleaning followed by digestion of the reject organics).
- Anaerobic digestion (optional)
- Power generation (optional)
- Wastewater treatment and discharge to sewer

Autoclaving can be viewed as a "pre-processing" step for other CT applications or as a CT process in its own right. Overall diversion of 70-90% can be achieved depending on the quality of the MSW feedstock.

Two firms are in active project development:

- Comprehensive, Resources Recovery and Reuse (CR3) (Reno, NV)
- World Waste International (San Diego, CA)

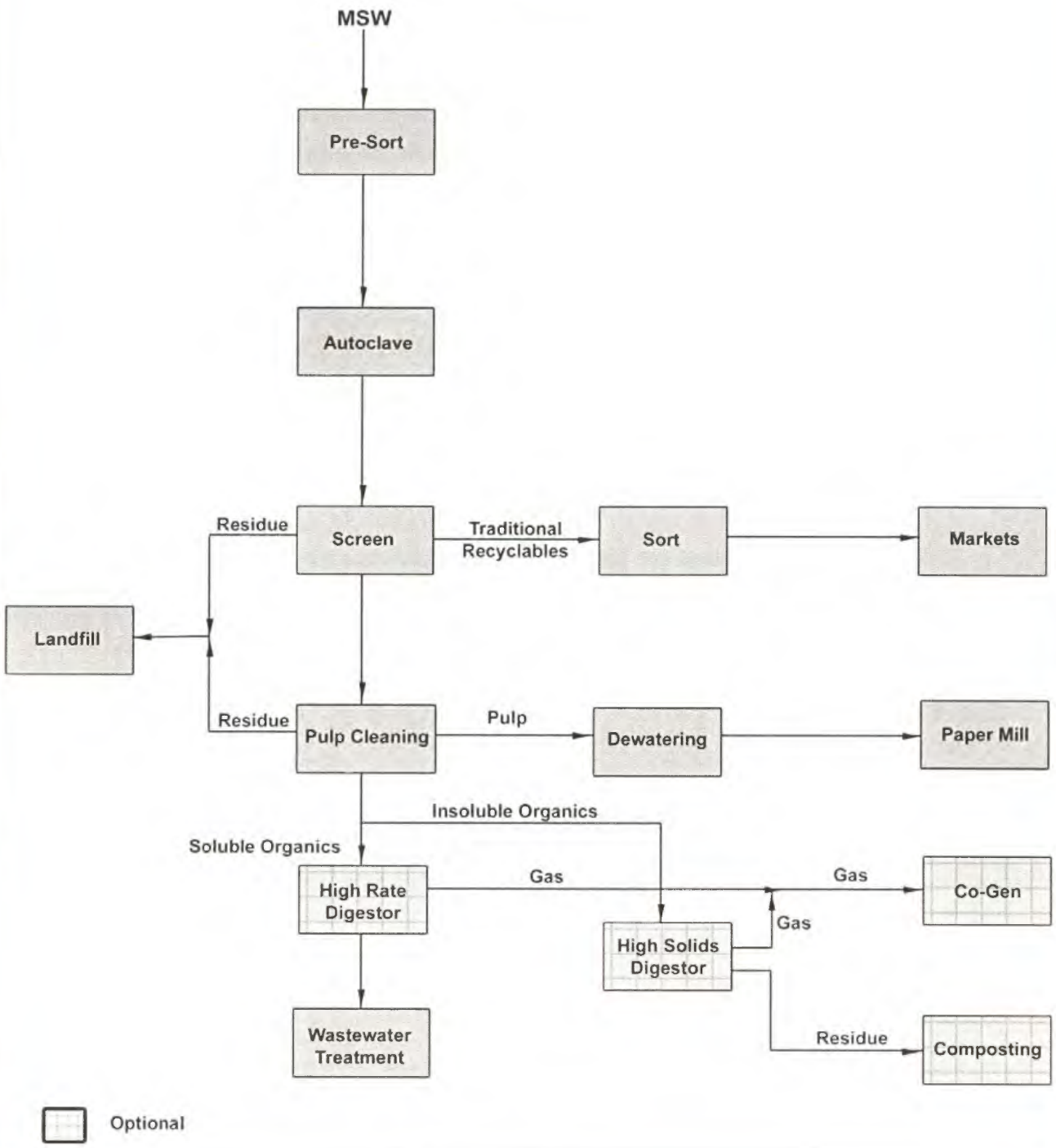
The importance of the ability of this technology to produce a high-quality organic feedstock for CT plants, all of which focus on the organic component of MSW, should not be overlooked. In fact, some of the greatest challenges facing these technologies are feedstock preparation (i.e. the problems with the first CCI plant in New Market, Ontario).

The first commercial CR3 has completed construction and is in the start-up phase in Minneapolis, MN. The plant will utilize two 8-ft diameter autoclaves to process up to 300 TPD of MSW into refuse derived fuel (RDF) for a nearby WTE plant.

The first commercial WWI plant is in construction at the CVT transfer station in Anaheim, CA. This plant features two approx. 12-ft diameter autoclaves that will process up to 500 TPD of mixed commercial and "post MRF" residue that is now disposed at the Brea Olinda Landfill. The recovered paper fiber will be dewatered to "wet lap" quality and sold to a local paper mill for manufacturing into new paper products, predominantly corrugated medium. This facility is due to start operations in the third quarter of 2005.

FIGURE 5.4

AUTOCLAVING



Fermentation or Bio-refining

Fermentation is the process of converting sugar to fuel-grade ethanol through Hydrolysis and Fermentation. Ethanol is a renewable, clean-burning fuel that results in a net-zero increase in greenhouse gases when MSW is used as the feedstock. This technology is widespread throughout the world, processing primarily corn and sugarcane into ethanol. For example, Brazil's vehicles run mainly on ethanol, not fossil fuels. Archer-Daniel- Midland (ADM), a Fortune 500 company, currently produces approximately 60% of the ethanol in the U.S. (all from corn). According to the Renewable Fuels Association, scores of ethanol plants in the U.S. produce nearly four billion gallons of ethanol per year, primarily in the Midwest, as demand for the fuel has grown rapidly in recent years.

In California ethanol is now being used as a replacement for MTBE (gasoline oxygenate). This has created a huge demand for ethanol (700 million gallons per year), which is currently being met by tank car shipments via rail from the Midwest.

Although virtually all our ethanol is currently made from corn or sugarcane, it can theoretically be manufactured from any organic material, including the organic fraction of MSW. Coincidentally, this fraction is predominantly the one still going to landfill disposal in Los Angeles. One example of bio-refining of a "waste" material is the Parallel Products plant in Rancho Cucamonga that produces about 6 million gallons per year of ethanol from waste soft drink beverages (Coca Cola, etc).

The essence of this technology, for application in this blueprint, is the breakdown of the organic fraction of MSW (paper, food waste, greenwaste) to sugar (glucose), followed by the bacteriological fermentation and distillation of the glucose to bio-fuels or bio-chemicals. The two dominant products are ethanol (clean burning fuel and gasoline additive), and acetic acid, although a wide range of end products is possible, including hydrogen for fuel cell cars. One benefit of this technology is the strength of the product markets, which are global in nature and non-traditional for MSW-derived materials.

Based on the initial report by URS Consultants for the City of Los Angeles, fermentation technology is not as advanced in a commercial sense as are either gasification or anaerobic digestion. In fact, there are no commercial cellulosic ethanol plants in the world at present. However, in five to 10 years, it is quite likely that this technology could be a major participant, and the lure of an almost unlimited ethanol market is irresistible. Thus the R&D work and the drive to commercialize a first project continues with some urgency.

From an environmental perspective, these plants are seen as low impact projects with most of the processes occurring in fully enclosed tanks and under biological conditions. This is particularly true of the enzymatic hydrolysis process which is all biological. However, even in the acid hydrolysis process, the acid is recaptured and the by-products (such as lignin and gypsum) made into saleable commodities.

There are several companies active in the field in the U.S. of which five (**Arkenol, BC International**, **Masada, Genahol, and BRI**) seem to be ahead as far as development of commercial plants using waste organics (agricultural or forest residues, processed MSW). Key projects in various stages of development in the U.S. include:

- **Masada, Middletown, NY** – 2,000 TPD MSW and biosolids-to-ethanol
- **Genahol, Canton, OH** – conversion of waste beverages and organic MSW to ethanol
- **BRI, Dallesport, WA** – gasification of 300 TPD of MSW and conversion of the syngas to ethanol
- **Iogen, Ottawa, Canada** – enzymatic hydrolysis of wheat straw to ethanol
- **Arkenol, Japan** – concentrated acid cellulose to ethanol

See **Figure 5.5** for a schematic diagram of the process.

These plants are complex, biological refineries costing in the $100 to $150 million range. Critical factors affecting development are the ability to obtain a guaranteed, long-term feedstock; obtain all permits; and secure financing. Although the technical aspect of these projects (i.e. will it work the way it's supposed to) has been guaranteed by engineering firms, each has experienced problems with financing. Without a reference plant, lending institutions are hesitant to participate. The capital-intensive nature of this technology continues to be an impediment; however, this could change overnight with a first project success.

Technologies Still in Development

Some technologies are simply not far enough along on the development curve. Typically these technologies have not passed the pilot plant stage, or are designed only to handle specialized wastestreams and feedstocks that are not MSW related. A short description of two of these follows:

- ***Fixation*** – the conversion of MSW to inert products. After shredding, the MSW is treated with a catalyst, which under high pressure sets into an inert solid, trapping all chemical constituents in a chemical bond. This material is then extruded into products such as building blocks, posts, and railroad ties. A demonstration plant was built and tested at the Advance Disposal Transfer Station in Hesperia, CA. Issues of reliability and performance remain, as well as questions regarding the marketability and environmental stability of the final products.

- ***Kinetic Disintegration*** – First American Scientific Corp. developed a pilot plant that used sound waves to powderize various waste materials. The process is most effective on select types of waste with markets for the pulverized product, such as: tires, drywall, glass, plastics, insulation, and biosolids. It is not geared to processing MSW, but may be of value as the front end of new technologies that work best on small particle material.

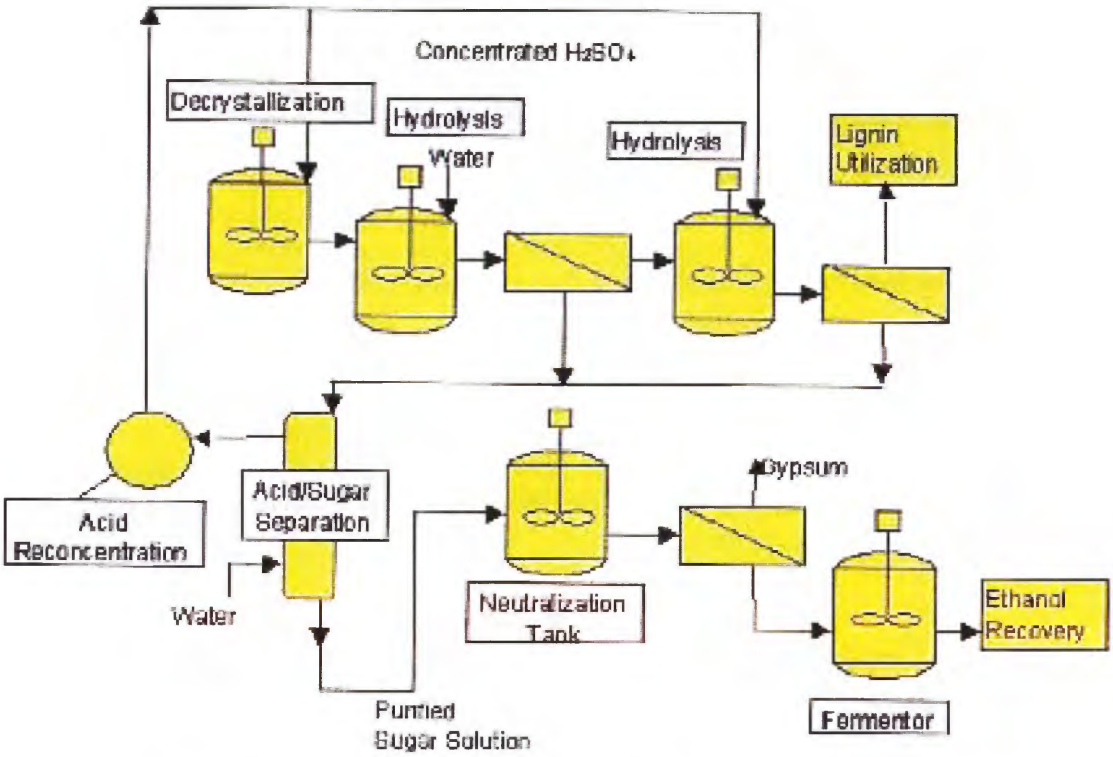
FIGURE 5.5

Fermentation

The conversion of cellulosic material to ethanol.

Concentrated Acid
Dilute Acid
Enzymatic

Concentrated Acid Hydrolysis



Typical Feedstocks: **Corn**
Sugarcane
Brewery Waste

Principal Products: **Ethanol Fuel**
Lignin

Source: CIWMB

CT Summary

Table 5.2 summarizes the pros and cons of the five highlighted CTs.

With the exception of the composting technologies, there is only one reference CT plant processing MSW in North America, and it is a small one in Toronto, Ontario (a BTA anaerobic digestion plant). However, it is likely that several more CTs will come on line in the next five years, including the two autoclave plants now completing construction.

Once the first plants are in the ground and operating successfully, any of these technologies could expand rapidly; just as they have in Europe and Japan.

The lack of successful implementation to date in N. America vs. the booming market for these technologies in Europe is easy to understand when one looks at the key factors that support such development:

- High waste disposal tipping fees (either landfill or WTE)
- Existing successful organics source-separation programs
- Landfill bans or taxes on organic waste disposal
- High green, renewable energy demand/value
- Societal acceptance (primarily compost products)
- Public and political support for higher cost solutions for environmental benefit
- Existing local reference plants
- Acceptance and support in the recycling community for new technologies

All of these factors are positive in Europe, whereas some are negative here in N. America and particularly in California. Of special interest in California is the last bullet in the above list. Alternative technologies, by and large, have had a very difficult path to acceptance by traditional recyclers and the even the California Integrated Waste Management Board. This negative reception stems from the following factors:

- Alternative technologies were seen as threats to existing "source separation" recycling programs (the black box that would do it all for you, eliminating the need for separation at the source).
- Gasification/Pyrolysis was viewed as nothing more than disguised WTE plants
- Conversion of organics to fuels and energy was considered a "low-end" use.
- There have been virtually no commercial size reference plants in N. America except for MSW composting, which has had a checkered past.
- Even with all the energy problems and huge societal cost of the recent energy crisis and reliance on imported oil, alternative fuels and green energy have not captured the public or political consciousness.

Nonetheless, as previously stated, several projects are moving forward, and a few successes could open the gates for a flurry of activity.

TABLE 5.2
ALTERNATIVE TECHNOLOGIES
SUMMARY EVALUATIONS

Alternatives	Description	Pros	Cons
Gasification/Pyrolysis	Thermal conversion of organic material to syngas (high percentage of methane), a small volume of ash, and water. The core of the technology is the thermal conversion unit, primarily various kinds of fluidized-bed, or fixed-bed, with the product gas used to generate steam or electricity.	• Capable of handling up to 1,500 TPD of MSW per plant • Generates very low air emissions and achieves high rates of burnout leaving little ash residue. • Gasification can be used as the front end of a bio-refinery to produce gas for conversion to ethanol.	• No commercial plants that gasify MSW are operating in the U.S. • High capital and operating costs means that the net tipping fee would likely be over $50 per ton. • Negative public acceptability of a thermal process
Fermentation	Breakdown of the organic fraction of MSW (paper, food waste, and greenwaste) to sugar (glucose), followed by the bacteriological fermentation and distillation of the glucose to bio-fuels or bio-chemicals. The two dominant products are ethanol (clean burning fuel and gasoline additive), and acetic acid.	• Capable of handling up to 1,500 TPD of processed MSW per plant • Ethanol is a renewable, clean-burning fuel that results in a net-zero increase in greenhouse gases. Huge California market as MTBE replacement • Many large plants in operation with corn and sugarcane feedstock	• Capital intensive • Lending institutions are hesitant to participate since there are no reference plants. • Cost of operation may be high • Difficult initial hydrolysis step
MSW Composting	In-vessel composting of MSW for production of soil amendment. Features controlled oxygen, moisture, and temperature environments to accelerate the decomposition of organics. Each in-vessel stage is generally followed by a curing stage, which is either an aerated-static pile or traditional windrow.	• Capable of handling up to 750 TPD of MSW per plant • Over 50 operational plants in Japan. • Four firms currently pursuing projects within the U.S. • Designed to handle raw MSW and biosolids. Does not need pre-processing of the MSW.	• Tipping fee of approximately $50 per ton is strongly impacted by the cost of residue disposal, and the value of the final compost • Marketability of the final product still a question. Some plants assign the compost a negative value in the early years.
Anaerobic Digestion	Anaerobic decomposition of organics, primarily biosolids and other distinct MSW wastestreams, including greenwaste, foodwaste and the other organic fractions.	• Capable of handling up to 500 TPD of processed MSW per plant. • Produces methane for heat and power generation, and liquid fertilizer and dry compost • Low environmental impacts • Over 50 operational plants in Europe • Accepts a diversity of organic feedstocks	• Only N. American reference plant is small demonstration facility in Toronto using the BTA technology • Requires good front end separation and feedstock preparation • Requires composting of digester residue, which can equal up to one-third or more of the incoming tonnage
Autoclaving	The steam "pressure cooking" of MSW in large rotating drums to facilitate recovery of recyclables and paper pulp, and the optional generation of gas for energy or fuel production.	• 2 plants in construction in the U.S. • Capable of handling up to 1,500 TPD or more of mixed MSW in 250 TPD modules • Recovers high levels of paper pulp • Can generate renewable energy • Can accept a diversity of feedstocks • Pulp and paper industry testing of recovered paper fiber is positive	• No reference plants-but two in construction in U.S. • Project costs yet to be confirmed at commercial sites. • No long term experience with use of pulp product in mills

THE SYSTEM

This section shows combinations of components previously discussed and how the utilization of enhanced existing programs when combined with new CT facilities creates a blueprint for approaching a zero waste goal. A flow diagram for each of the three sectors (residential, commercial and C&D debris) that make up the City of Los Angeles' disposal stream is illustrated and discussed on the following pages.

Pre-Processing

The kingpin of the RENEW LA blueprint is CT. These technologies are crucial because they have the ability to process and reclaim the organic material that comprises most of the waste that is still going to disposal. This is where we can boost our diversion from the 60% range to over 90%.

With the exception of MSW composting (and the case could even be made for that), none of the CTs perform as well on mixed, unprocessed MSW. They require "pre-processing" of the wastestream to provide a feedstock rich in organic material and low in contamination. The best facilities in Europe and Japan typically operate on such feedstocks; and historically one of the major problems in transplanting foreign technologies to the U.S. has been the difference in feedstock quality.

As discussed earlier in this section, there are two basic methods of pre-treatment, the traditional MRF with some modifications, and new autoclave systems. The purpose of the pre-processing will vary slightly between the thermal and the biological CTs. The latter require strictly organic material in terms of easy biodegradability. This includes: paper, cardboard, foodwaste, and the finer fraction of greenwaste (grass, leaves, garden clippings). In addition to these materials, thermal conversion can accept plastics, wood, and the larger fraction of greenwaste (tree trimmings, woodier brush, etc.). Both MRFs and autoclave systems can be configured to maximize recovery of certain constituents - in essence to sort for certain feedstock quality.

Some CT companies promote their own "front-end" systems for processing MSW into organic feedstocks. These systems are generally some type of MRF including sorting, screening and perhaps grinding to separate organics from inorganics. One of the digestion technologies (Arrow Bio) includes water-based separation (float tank) in an unusual variation on the typical MRF. Some of the MSW composting technologies that take mixed MSW use the rotating tube portion of the plant to achieve a sort of biological MRFing, allowing a simple screening afterwards to provide the organic/inorganic separation. This is followed by a traditional aerated, enclosed composting/curing step.

Figures 5.6 through 5.8 highlight the flow of material through a pre-processing system and a following CT plant and on into the market place. In each case, it can be seen that the combination of MRF/Autoclave and CT can divert roughly 80%. And this is assuming a "post recycling", "post source separation" material, as dictated by recently proposed CIWMB guidelines.

Residential Sector

Figure 5.9 on the following page shows the blueprint for the residential sector. The numbers represent a rough mass balance, tracing 100 tons of material through the system of facilities that will reuse, recycle, compost or convert it. These numbers are approximate but give an indication of the magnitude of the various material streams and the relative facility capacities needed. This hypothetical mass balance achieves, in no small part due to new CT facilities, a 90% reduction in tonnage going to a landfill (inert residual repository); a residue comprised of stable inert material from MRFs, biomass power plants, and CTs.

As can be seen, most of the technology is already existing, but will need to be expanded significantly. However, the new elements, including the conversion technologies and autoclaves in conjunction with mixed waste processing MRFs, are critical factors in handling mixed material and residues from other processes.

Single Family

The residential blueprint calls for continuation of the 3-can curbside recycling system for single family homes and small multi-family complexes serviced by the City's Bureau of Sanitation. The blue can recyclables, currently 12% of total single family generation, will continue to be processed at area MRFs, with greater education efforts leading to less contamination, and new technologies (such as optical glass sorting) expanding recovery capabilities.

Green can yardwaste, presently 29% of single family generation, will continue to be processed by chipping and grinding followed by composting or may be directed to CT plants in the future for conversion to renewable energy. This will prove particularly valuable when residential foodwaste is added to the green can program, as it is an excellent feedstock for CT plants. The conversion of green and foodwaste will provide a much needed alternative market for this low value material, as well as contributing to DWP's RPS program. An example is the Bio-Converter Park LLC project, which would convert 2,700 TPD of City-generated greenwaste to energy for sale to DWP, and to compost for sale as soil amendment. Again, enhanced and intensified education and the growing use of biodegradable plastic lawn bags will lower contamination levels to produce a higher quality end-product.

Black can material, nearly 60% of the total single family generation and currently hauled to landfills directly or via transfer stations with essentially no recycling, will be directed to CT facilities.

FIGURE 5.6

RESOURCE MANAGEMENT SYSTEM
AUTOCLAVE & GASIFICATION

(a sample 100 tons of MSW)

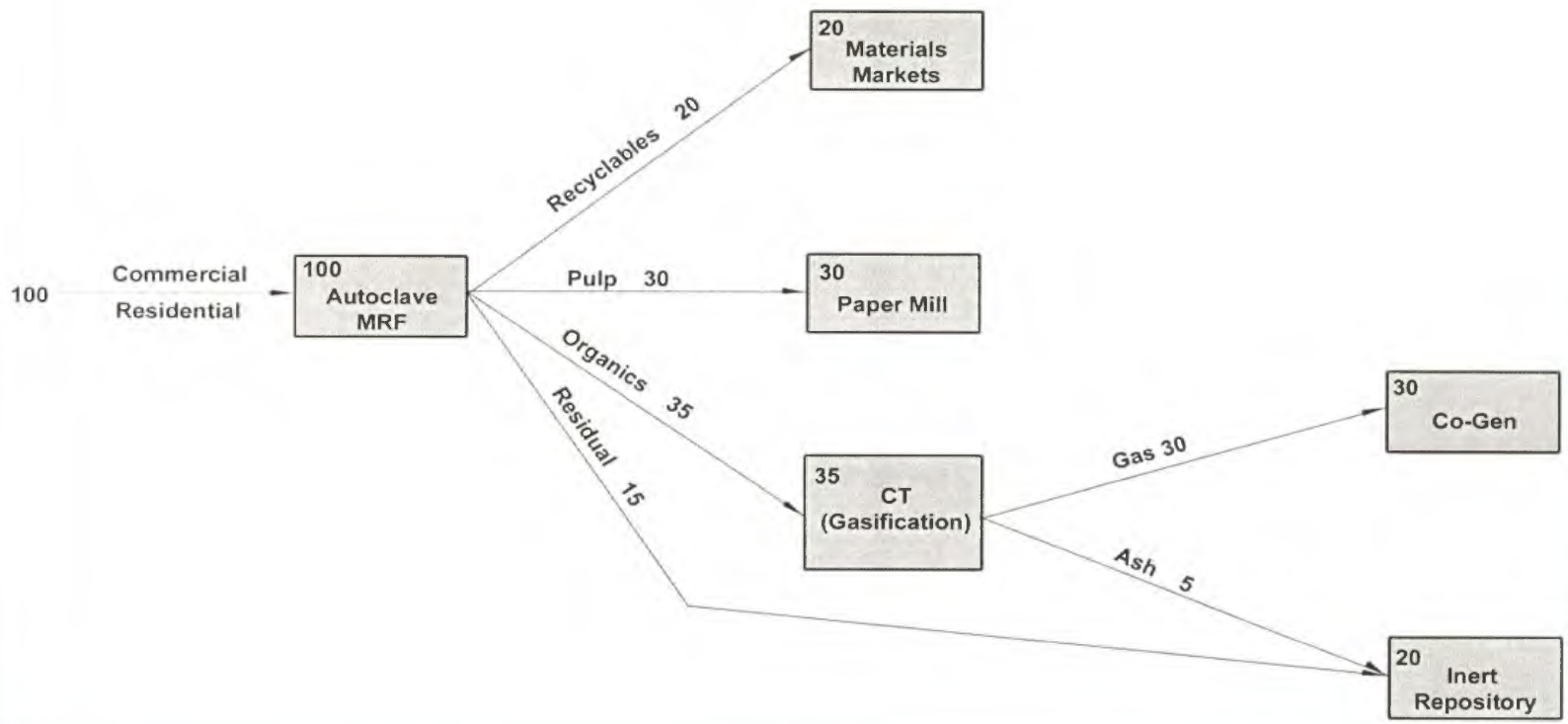


FIGURE 5.7

RESOURCE MANAGEMENT SYSTEM
AUTOCLAVE & ANAEROBIC DIGESTION

(a sample 100 tons of MSW)

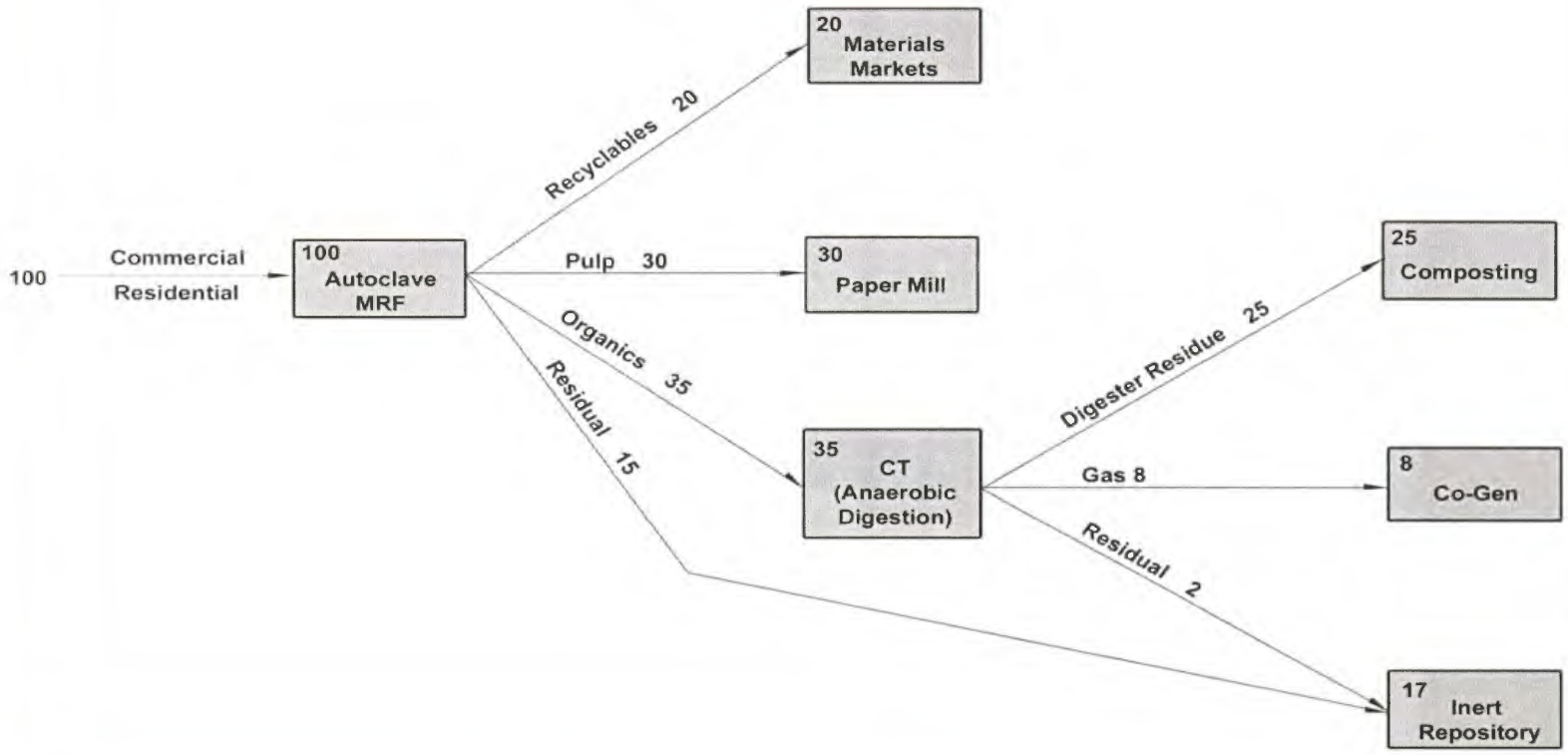
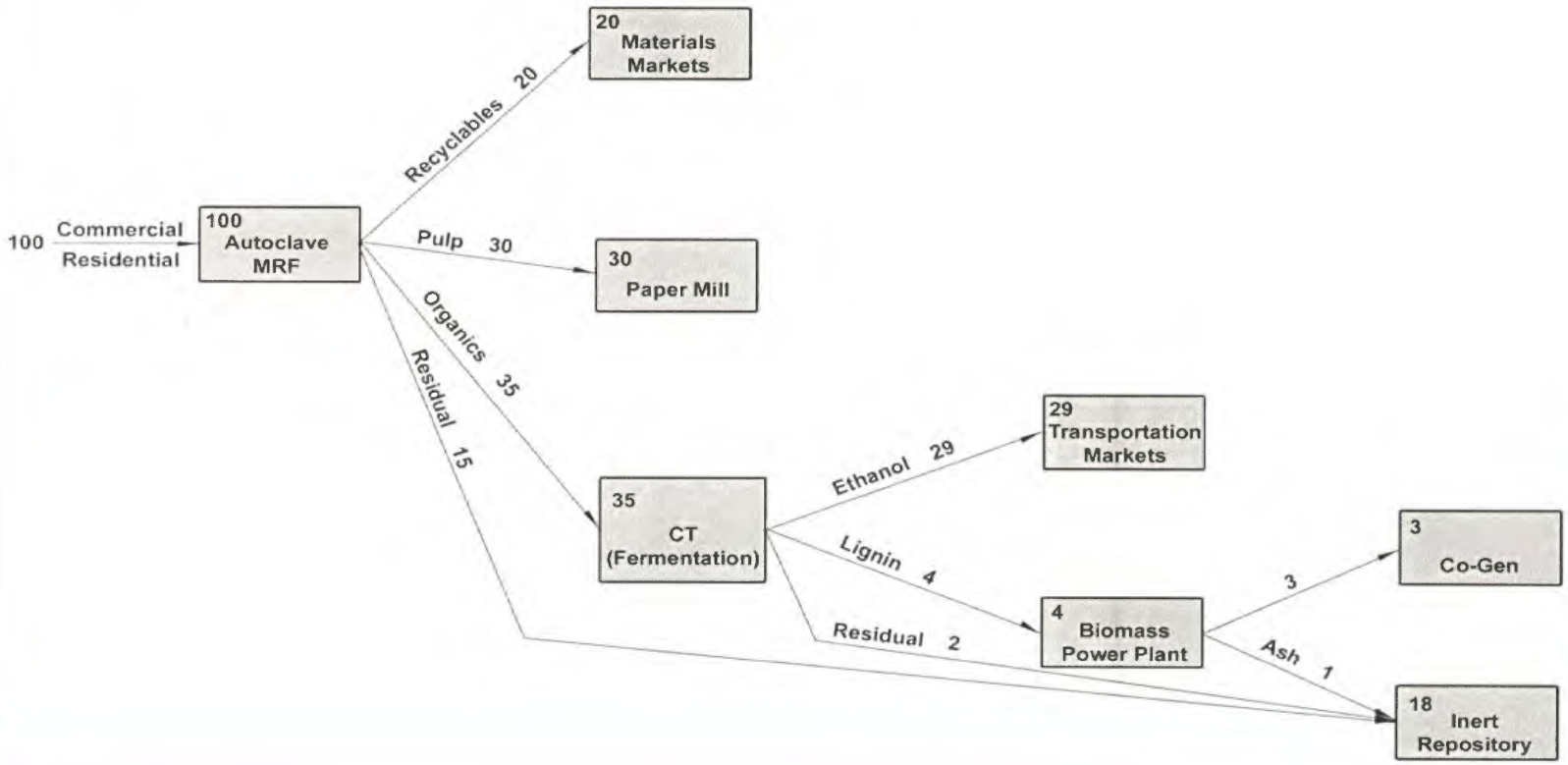
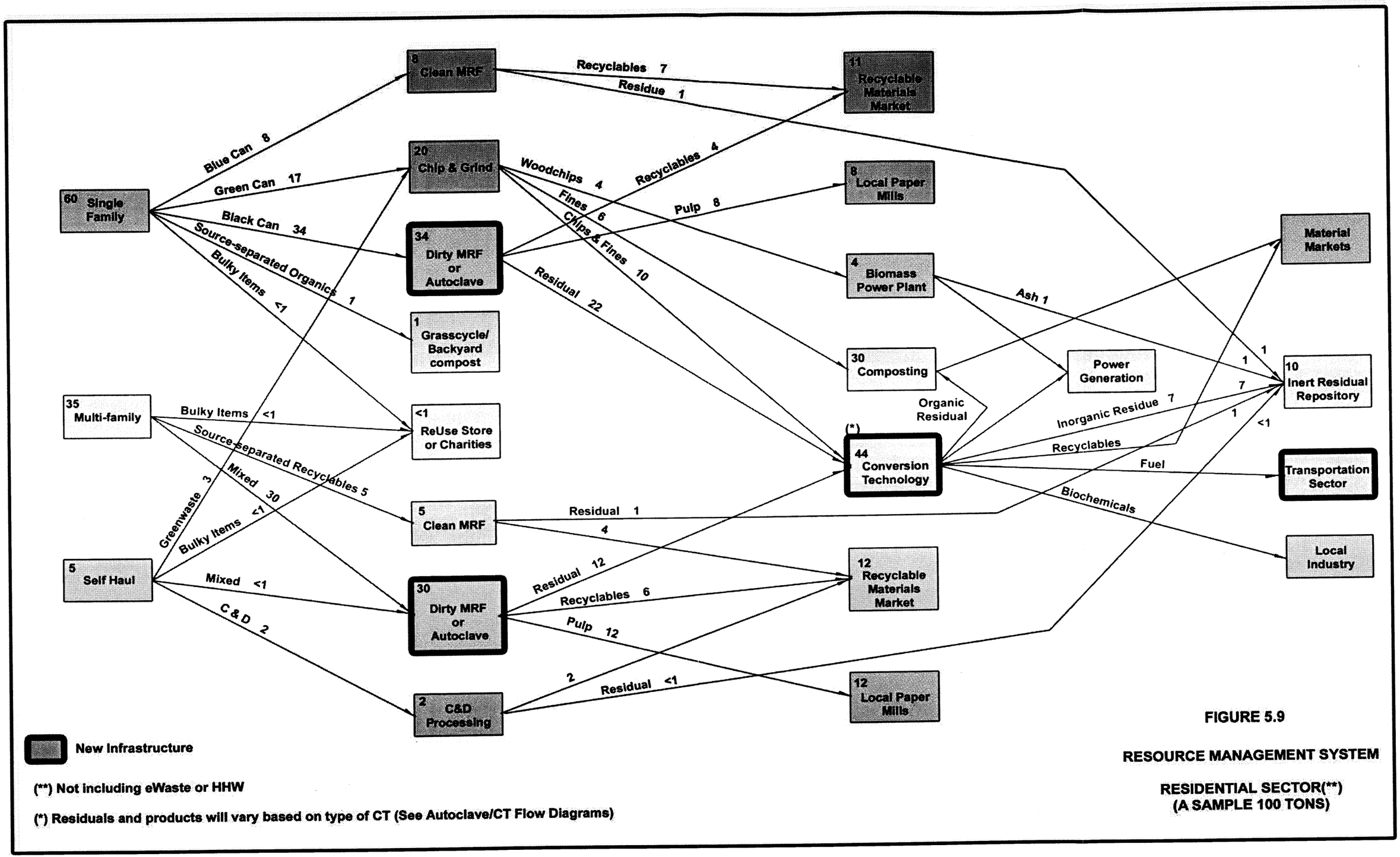


FIGURE 5.8

RESOURCE MANAGEMENT SYSTEM
AUTOCLAVE & FERMENTATION

(a sample 100 tons of MSW)





(**) Not including eWaste or HHW

(*) Residuals and products will vary based on type of CT (See Autoclave/CT Flow Diagrams)

FIGURE 5.9

RESOURCE MANAGEMENT SYSTEM

RESIDENTIAL SECTOR(**)
(A SAMPLE 100 TONS)

Depending on the technology, the CT plant will convert the organics into electricity, fuel, compost or chemicals. Inert residue from the system will be deposited in landfills and may, at some future date, be mined for recovery depending on technological advances, costs and markets.

A minor, but growing, amount of single family home greenwaste will never enter the wastestream but will be either "grass-cycled" by mulching lawn mowers that leave the cut grass on the lawn, or processed in backyard composters for on-property use as soil amendment. This in fact, is the most elegant solution for this material, but will take significant education, financial incentives (such as free composting bins), and a change in public behavior.

Bulky items will continue to be collected by the Bureau of Sanitation and the Bureau of Street Services or donated to Re-use stores and charities. With expanded education and a growing remanufacturing/reuse infrastructure, more of this material (furniture, lumber, carpeting, appliances, mattresses, and box springs) should be able to be diverted from landfills in the future.

Multi-Family

Multi-family is a very important sector that generates significant tonnage and yet has been historically under-served in recycling because of inherent challenges. This material will be handled by the expansion of a variety of recycling programs now in the pilot stage under the governance of the Bureau of Sanitation. These may include the following:

- Separate blue cans (similar to the single family home program)
- Blue bags for recyclables (collected with the trash and pulled out and sorted at the MRF)
- Other types of source separation programs

Alternatively, multi-family material could be collected "as is" and processed in its mixed state at "dirty" MRFs, so-called because the material is more contaminated than source separated material processed at "clean" MRFs. Mixed waste processing is also one of the pilot programs commissioned by the Bureau of Sanitation. Given the level of contamination and nature of this material, diversion is anticipated to be relatively low, perhaps 15%. Several advantages of the mixed waste approach are: it requires no change in collection operations; it requires no additional bins, bags, or containers; and 100% of the units are "participants" in that their material gets sorted. However, cross-contamination of products (such as food waste on paper) can reduce recovery levels.

However, in the new paradigm, the residue from the MRFs will be transferred to CT plants where the remaining organic fraction would be recovered and converted.

In yet another variation, mixed multi-family material could be fed directly to an autoclave system for recovery of not only traditional recyclables, but paper pulp as well. Depending on configuration, the residue from the autoclave system could be digested for further previously untapped diversion and energy recovery.

Self-Haul

Under an ideal new system, rebates would "incentivize" self-haulers to deliver their material to MRFs rather than landfills or transfer stations. Likewise, greenwaste will be incentivized for delivery to local chipping and grinding operations, and C&D debris (the majority of self-haul material) to C&D processing facilities.

Commercial Sector

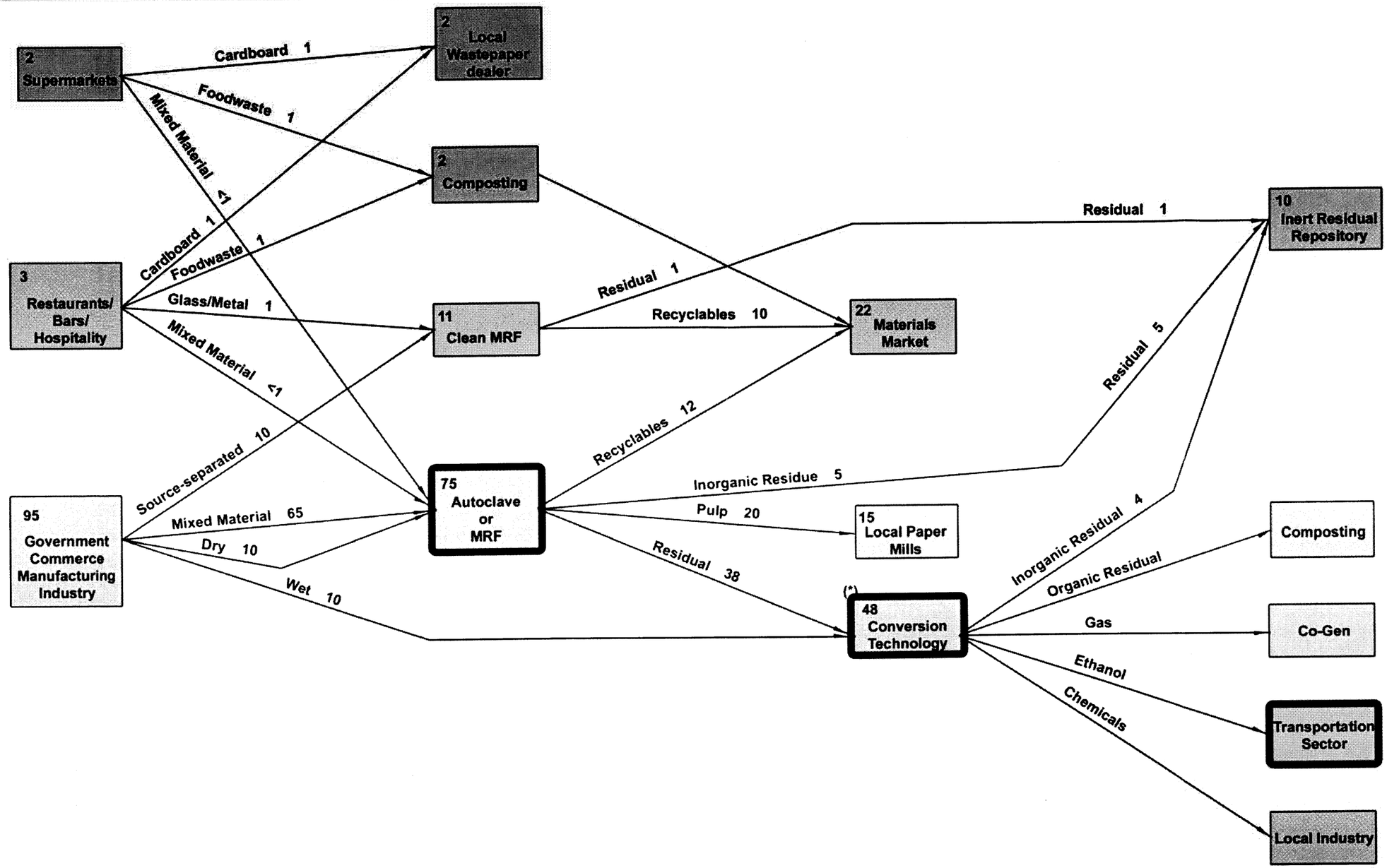
The commercial sector is both the greatest generator and the greatest diverter of material in the City of Los Angeles. As defined here, commercial includes everything that is not residential or construction and demolition, namely institutions such as schools and government facilities, offices, retail, hospitality and manufacturing.

Figure 5.10 on the following page shows the ultimate blueprint for the commercial sector. The numbers represent a rough mass balance, tracing 100 tons of material through the system of facilities that will reuse, recycle, compost or convert it. These numbers are approximate but give an indication of the magnitude of the various material streams and the relative facility capacities needed. This hypothetical mass balance achieves, in no small part due to new CT facilities, a 90% reduction in tonnage going to a landfill. That residue will be comprised of stable inert material from the MRFs, biomass power plants, and CTs.

As can be seen, most of the technology is already existing, but will need to be expanded significantly. However, the new elements, including the conversion technologies and autoclaves in conjunction with mixed waste processing MRFs, are critical factors in handling mixed material and residues from other processes.

Supermarkets

Supermarkets will continue programs for source separation and baling of cardboard which are already mature. This material will continue to be sold into the wastepaper market directly, or delivered to MRFs for sorting. The second major program will be the expansion of produce separation for composting. Currently, over 1,000 supermarkets in Los Angeles participate in a program operated by Community Recycling. This should continue to grow until all supermarkets in the City have joined this or similar programs.



New Infrastructure

(*) Residuals and products will vary based on type of CT (See Autoclave/CT Flow Diagrams)

FIGURE 5.10

RESOURCE MANAGEMENT SYSTEM

COMMERCIAL SECTOR
(A SAMPLE 100 TONS)

Restaurants, Bars and Hotels

Restaurants, bars and hotels will continue programs for source separation and recycling of glass bottles. However, this program will be augmented by the addition of separate foodwaste collection. Currently, 45 of a planned 150 restaurants in Los Angeles are participating in a pilot foodwaste collection and composting program run under contract to the City by Norcal. Assuming the program will duplicate the success of the mature program in San Francisco, most of the remaining restaurants, bars and hotels in the City should join the program over the next few years. Although **Figure 5.10** shows all this material going to composting, a portion could be diverted to CT facilities, where it would digest or gasify readily.

Mixed Use

The great bulk of the commercial sector is a vast mix of uses generating a diverse wastestream with a preponderance of paper (31%) and organic material (41%) based on Bureau of Sanitation data. Results are not yet available for the City "dirty MRF" pilot project for the commercial sector. However, based on performance at existing MRFs processing mixed commercial waste, typical diversion can be expected to range from 15% to 30% depending on the composition of incoming material.

This diversion rate can be improved significantly by establishing a "wet/dry" collection system in which trucks are re-routed to collect accounts with either wetter material containing foodwaste, or dryer material of mostly paper and cardboard, but not both as is now standard practice for economy of collection. In this way, the wetter material can be directed to certain CT facilities, such as anaerobic digestion, while the dryer loads can be more easily MRF'd with improved recovery in the 30-40% range.

Regardless of the type of collection it is clear that the preponderance of the commercial wastestream will be collected in a mixed state. The City's recently enacted policy of providing a rebate of $25/ton diverted is supporting the delivery of more mixed material to existing dirty MRFs, although there are few of these.

This blueprint envisions that this material will be processed by a series of MRFs and autoclave systems. As discussed earlier in this section, autoclaves provide a relatively quick and easy separation of organic and inorganic fractions. The inorganics can be sorted for traditional recyclables and the organics processed for paper pulp recovery and optional energy and compost generation, or ethanol and bio-chemical production. The diversion of this material by combinations of MRF, autoclave and CT can produce very high levels of diversion, overall in the 90% range.

Of importance in allowing no more than 10% residue to landfill for the commercial sector will be significant efforts on all fronts in the area of producer responsibility to:

- Reduce the amount of product packaging and waste produced
- Eliminate the creation of material that is difficult or impossible to recycle

- Support the industrial sector transition from one-way product sales to a service orientation in which products are merely "leased" to consumers and are taken back by the manufacturers for recycling at the end of their useful life
- Design in ease of re-manufacturing

Construction & Demolition Sector

Even with the huge construction, demolition, and remodel industry in Los Angeles, Bureau of Sanitation records indicate that C&D debris comprises a relatively small amount of the material being landfilled at present. This is likely due to the fact that much of this material is already being source-separated at the construction sites and recycled, or delivered mixed to C&D processing facilities.

Figure 5.11 on the following page shows the ultimate blueprint for the C&D sector. The numbers represent a rough mass balance, tracing 100 tons of material through the system of facilities that will reuse, recycle, compost or convert it. These numbers are approximate but give an indication of the magnitude of the various material streams and the relative facility capacities needed. This hypothetical mass balance achieves a 90% reduction in tonnage going to a landfill – a residue that will be comprised of stable inert material from the MRFs, biomass power plants, and CTs. Although much of this infrastructure is already in place in Los Angeles, the new CT facilities could play a role.

The City's recently enacted policy of providing a rebate of $10/ton diverted is supporting the delivery of more mixed C&D to certified processors. See **Appendix K** for a list of these facilities.

Deconstruction

This plan envisions a continual growth in the deconstruction industry until as much as 5% (or even more) of the demolition projects are conducted as recovery operations of this type. Most of the recovered construction materials are now trucked to Mexico, however, there may be an increase in the market here locally. This would likely take a shift in public attitude toward the purchase of "used" material such as lumber. Another smaller segment of this material may go to local reuse stores; and low grade wood, could be delivered to chip and grind operations. Treated could be delivered to CT plants.

Onsite Separation

Onsite separation and recycling of wood, drywall, greenwaste, roofing material, and metal is expected to continue and grow in the future as costs of disposal rise and further incentive programs are put in place to support diversion. A small quantity of material may be recovered for sale at reuse stores, but the bulk of this material will be wood and greenwaste delivered to chip and grind operations, and inerts delivered to C&D processors or directly to local markets, if it is sufficiently clean.

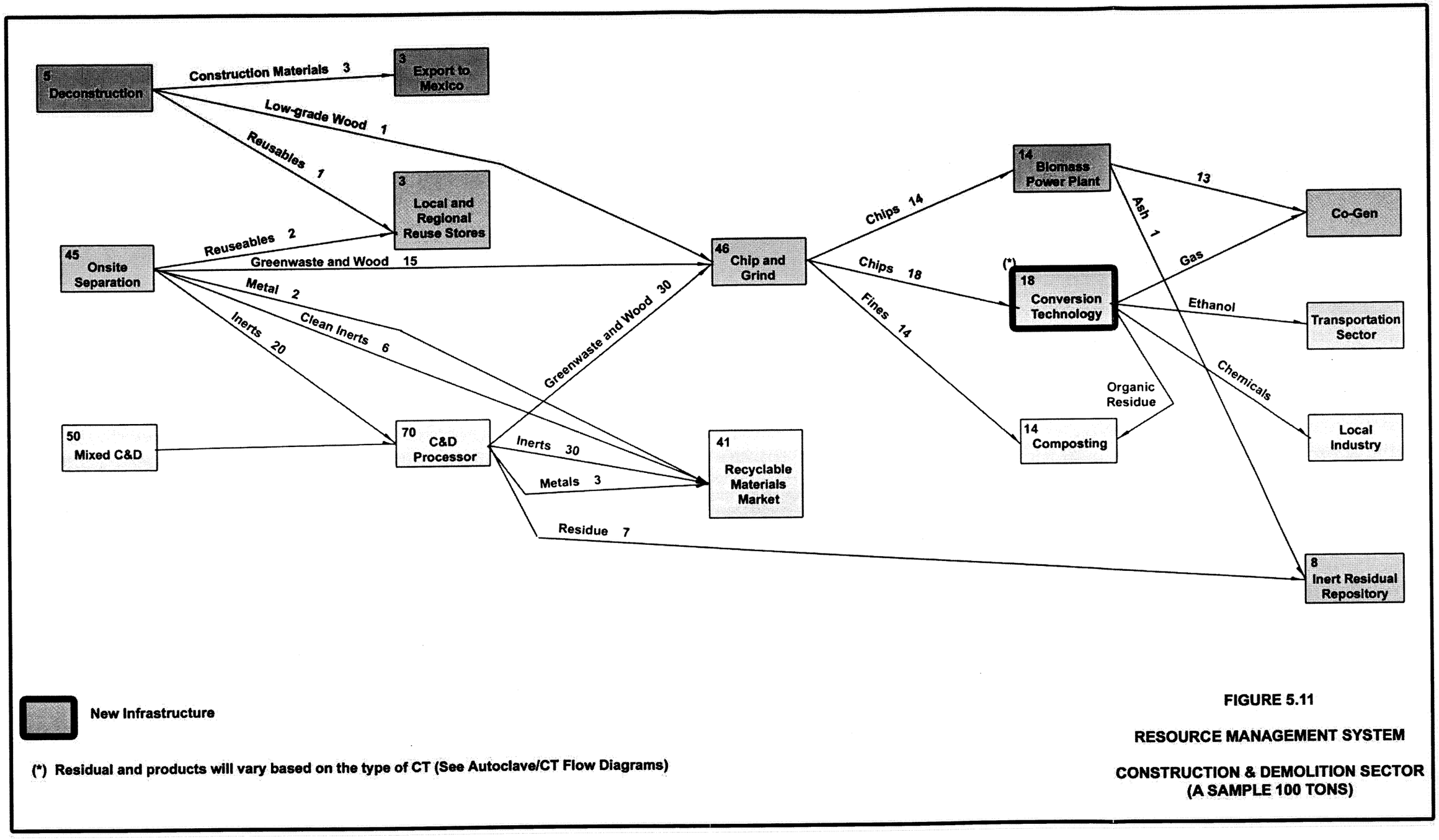


FIGURE 5.11

RESOURCE MANAGEMENT SYSTEM

CONSTRUCTION & DEMOLITION SECTOR (A SAMPLE 100 TONS)

Mixed C&D

In this blueprint, it is assumed that roughly half of the material will be delivered mixed to processors for sorting and recycling. A substantial amount of this activity is occurring today, and more can be expected in the future. This is becoming a mature industry, and existing facilities, such as Community Recycling in Sun Valley and MarBorg Industries in Santa Barbara have consistently achieved diversion levels in the 50-90% range. And now in Los Angeles, new C&D processors are coming on line to the point where, when added to all the existing source separation and de-construction programs, an across the board 90% diversion appears attainable in the not too distant future.

The blueprint also shows that woodwaste can be used as feedstock to existing biomass power plants. This is also a mature industry and one that is used extensively for woodwaste diversion today. In the future, CT facilities (gasification or fermentation) for conversion to electricity, ethanol, or chemicals will likely play a supportive role as the value of these products continues to escalate.

Certainly by the time the LACSD rail haul is running in late 2009, there should be little C&D material remaining in the disposal wastestream.

GETTING THERE

This section combines the blueprints presented previously, with the City of Los Angeles wastestream, the actual numbers, and develops a strategy of facility and program development for reducing the amount of material going to landfills by 90% by 2025 - our zero waste or *"darn close"* goal.

Table 5.3 on the following page presents an accounting of how the City of Los Angeles can approach a zero waste target over the next 20 years through a combination of reuse, recycling, conversion and inert residue disposal.

The table is based on a conservative assumption that the disposal wastestream will grow at 2% per year. In other words, no significant source reduction, no decrease in packaging, no drop in per capita waste generation – in fact, just the opposite. It is assumed that we as a society will "continue to continue" our wasteful habits and thus will need to handle ever increasing amounts of material at the "end of the pipe".

It is hoped, of course, that this will not be the case in actuality, that consumer responsibility coupled with producer responsibility and other measures will result in decreased per capita generation. However, if past performance is any guide, a realistic plan cannot count on this.

TABLE 5.3
RESOURCE MANAGEMENT PLAN
(Zero Waste Target 2025) (***)

Year	Citywide Generation TPD (*)	Existing Diversion Programs (**)	Tonnage To Disposal	Wastestream		Cumulative New Diversion Programs (TPD) Reuse	Recycle	Compost	Convert	Total Diversion Tonnage	Final Disposal Tonnage	Overall Diversion (TPD)
2005	37,959	23,673	14,286									
				Residential	Single Fam						3,714	
					Multi-Fam						2,292	
				Commercial							7,898	
				C&D							382	
		Totals									***14,286***	**62**
2010	41,910	26,137										
			4,101	Residential	Single Fam	20	50	220	-	290	3,811	
			2,531		Multi-Fam	5	250	-	400	655	1,876	
			8,720	Commercial		50	795	-	400	1,245	7,475	
			422	C&D		25	150	-	-	175	247	
		Totals	**15,773**			**100**	**1,245**	**220**	**800**	**2,365**	***13,408***	**68**
2015	46,272	28,857										
			4,527	Residential	Single Fam	40	100	390	600	1,130	3,397	
			2,794		Multi-Fam	10	550	-	1,000	1,560	1,234	
			9,628	Commercial		100	2,215	-	1,600	3,915	5,713	
			466	C&D		50	300	-	-	350	116	
		Totals	**17,415**			**200**	**3,165**	**390**	**3,200**	**6,955**	***10,460***	**77**
2020	51,088	31,861										
			4,999	Residential	Single Fam	60	150	560	3,000	3,770	1,229	
			3,085		Multi-Fam	15	600	-	1,000	1,615	1,470	
			10,630	Commercial		150	2,715	-	4,000	6,865	3,765	
			514	C&D		75	350	-	-	425	89	
		Totals	**19,227**			**300**	**3,815**	**560**	**8,000**	**12,675**	***6,552***	**87**
2025	56,405	35,177										
			5,519	Residential	Single Fam	80	175	695	3,000	3,950	1,569	
			3,406		Multi-Fam	20	625	-	2,200	2,845	561	
			11,736	Commercial		200	3,215	-	6,400	9,815	1,921	
			568	C&D		100	375	-	-	475	93	
		Totals	**21,228**			**400**	**4,390**	**695**	**11,600**	**17,085**	***4,143***	**93**

(*) Assumes 2% growth in each sector per year due to population and commerce increase
Year 2005 based on actual tonnages reported by Bureau of Sanitation for 2002 extrapolated at 2% per year
(**) Assumes 2% growth in existing programs per year
(***) All tonnage based on 5 days/week

	Existing programs
	RENEW LA programs

This being said, **Table 5.3** demonstrates that it is possible to achieve a goal of 90% reduction, with only a 10% inert residual going to landfills. As shown, this will take massive efforts in the reuse, recycling and conversion areas, which can only be achieved by an ambitious development of new facilities and infrastructure, and the enactment of policies and mandates that reinforce this development.

The major components of the plan for each of the five year periods are in the sections discussed below, along with **Tables 5.4 through 5.7** that summarize the programs and facilities that, when put in place, achieve the desired 90% diversion in five year increments for the next 20 years. The total diversion from each table matches the new diversion for each 5-year period on **Table 5.3**.

Of necessity, **Tables 5.4 through 5.7** reflect one major simplification - that CT facilities receive material from one specific wastestream, multi-family or commercial for instance. This was done to calculate the number and size of CT facilities needed and to demonstrate the 90^{+}% diversion level. In reality, CT facilities will likely receive material from various wastestreams in their geographic area. However, as of this writing, MSW data is not available by geographic area for the waste hauled by the private sector. Thus, this type of calculation was not possible.

Once a specific CT project is identified in one of the seven refuse collection districts, a detailed analysis of the feedstock and pre-processing must be conducted to allow for proper design. This will include wastestream origin, quantification and composition analyses.

2005-2010 (Table 5.4)

Residential Sector

The first major element is the implementation of multi-family recycling for 50% of the units City-wide. It is assumed that half of these will be served by one type of source separation program or another and that this material will be processed by existing clean MRFs. The other half will be serviced by existing dirty MRFs.

The second major element will be the development of a 500 TPD CT facility to process the organic fraction of the mixed multi-family material. It is assumed that the feedstock for the CT will be pre-processed by a MRF or autoclave.

Other elements of the 2005-2010 planning period in the residential sector include:

- Addition of food waste to the Green Can
- Continued and growing use of thrift and other reuse stores
- Education for the blue can recycling system
- Renewed marketing to encourage backyard composting and mulching lawnmowers

TABLE 5.4
(2005-2010)
STRATEGIC PLAN
PROGRAM IMPLEMENTATION AND FACILITY DEVELOPMENT

2005-2010			
WASTESTREAM	**PROGRAM**	**NEW DIVERSION This Period (TPD)**	**NEW FACILITIES NEEDED**
RESIDENTIAL			
Reuse	Thrift Stores	25	
	Reuse Stores		
Recycle	Education improves Blue Barrel	50	
	50% Multi-Family Recycling implemented	250	2,531 x 0.5 x 0.20 = 253 TPD recovered
			25% source separation programs absorbed by existing clean MRFs
			25% mixed waste programs absorbed by existing dirty MRFs
			Central LA (with resurrected MRF)
			Angelus Western
			SVPS
			American Disposal
			Community
			Innovative
Compost	Grasscycling	100	
	Backyard composting	20	
	Add foodwaste to Green can	100	
Convert	One plant developed	400	500 TPD at 80% efficiency = 400 TPD diverted
			(with MRF/Autoclave front end)
COMMERCIAL			
Reuse	Product exchanges	50	
Recycle	Improved source separation	250	
	50% of waste MRF'd	545	4,360 TPD of mixed waste MRF processing handled at existing MRFs
			4,360 TPD x 0.50 x 0.25 = 545 TPD recovered
Convert	One plant developed	400	500 TPD at 80% efficiency = 400 TPD diverted
			(with MRF/Autoclave front end)
C & D			
Reuse	De-construction grows	25	
Recycle	Increase in onsite source separation	50	
	MRF recovery	100	
	TOTAL	**2,365**	

Commercial Sector

The first major element is the processing of 50% of the mixed commercial wastestream at existing dirty MRFs. This will require advanced planning and perhaps enhancement of facility processing capability to handle the processing of 4,360 TPD of mixed commercial material.

It must be noted that these existing facilities are already processing material and operate at varying capacities relative to their permit limits. Three of them are actively pursuing permit expansions for greater capacity: Community Recycling, Sun Valley Paper Stock, and American Waste Industries.

Some of the facilities in Los Angeles that are currently permitted and which could participate in such a program are:

Facility	Location	Permitted Capacity (TPD)
CLARTS (City-owned)	Central LA	4,025
Community Recycling	Sun Valley	2,500
Sun Valley Paper	Sun Valley	750 (in process)
American Waste	Sun Valley	1,000
Angelus Western	Central LA	650
Innovative Disposal	Vernon	1,250
East LA Recycling	E. LA	650
Falcon Refuse	Wilmington	1,850
	TOTAL	**12,675**

The second major element in the commercial sector is the development of one 500 TPD CT facility to process "post MRF or autoclave" MSW.

Other elements of the 2005-2010 planning period in the commercial sector include:

- Improved product exchanges
- Improved and enhanced source-separation programs

C&D Sector

As shown in earlier tables, the bulk of the C&D wastestream in the City of Los Angeles is already being processed and diverted to a high degree. According to the Bureau of Sanitation, only 100,000 tons of C&D material was disposed in 2002 (the latest year for which records are available) and over 1.6 million tons were diverted.

New C&D processors are coming on line and currently the City has certified 11 facilities with sufficient capacity to process the remaining material and new material generated by growth in the economy in the future. (See **Appendix K** for a listing of the certified processors.)

The main elements of the 2005-2010 planning period in the C&D sector include:

- Growing de-construction activity
- Improved and enhanced source-separation programs
- Growing MRF processing and recovery

2010-2015 (Table 5.5)

Residential Sector

The first major element is the implementation of multi-family recycling for the remaining 50% of the units City-wide (100% implementation). It is assumed that half of these will be served by one type of source separation program or another and that this material will be processed by existing clean MRFs. The other half will be serviced by dirty MRFs and that this material will also be processed by existing facilities with major expansions, or by two new 750 TPD mixed material MRFs or autoclave systems.

The second major element will be the development of 1,500 TPD of new CT capacity to process the organic fraction of the Black Can and multi-family material. It is assumed that the feedstock for the CT will be pre-processed by a MRF or autoclave. These CT plants and expansions of existing plants will be larger than the original 500 TPD facilities because operating experience and proven performance will support successful design, permitting, financing and operation at a larger scale.

Other elements of the 2010-2015 planning period in the residential sector include:

- Improvement in participation of foodwaste in the Green Can program
- Continued and growing use of thrift and other reuse stores
- Education for the blue can recycling system
- Marketing to encourage backyard composting and mulching lawnmowers

Commercial Sector

The first major element is the processing of the remaining 50% (for a total of 100%) of the mixed commercial wastestream, roughly 4,700 TPD, at two new MRFs, or similar capacity expansions at existing MRFs. The second major element is the development of an additional 1,500 TPD of CT capacity to process "post MRF or autoclave" MSW.

Other elements of the 2010-2015 planning period in the commercial sector include:

- Improved product exchanges
- Improved and enhanced source-separation programs

C&D Sector

The first major element is the processing of the final 50% of the mixed C&D wastestream (100% total) at three new 1,000 TPD C&D processing facilities.

Other elements of the 2010-2015 planning period in the C&D sector include:

- Growing de-construction activity
- Growing on-site reuse of materials
- Improved and enhanced source-separation programs
- Growing MRF processing and recovery

TABLE 5.5
(2010-2015)
STRATEGIC PLAN
PROGRAM IMPLEMENTATION AND FACILITY DEVELOPMENT

2010-2015			
WASTESTREAM	**PROGRAM**	**NEW DIVERSION This Period (TPD)**	**NEW FACILITIES NEEDED**
RESIDENTIAL			
Reuse	Thrift Stores	25	
	Reuse Stores		
Recycle	Education continues to improve Blue Barrel	50	
	Remaining Multi-Family Recycling implemented (2)	300	1,528 TPD x 0.20 = 306 TPD
			25% source separation programs absorbed by existing clean MRFs
			25% mixed waste programs absorbed by existing dirty MRFs or autoclaves
			Two mixed waste MRFs or autoclaves at 750 TPD each (or expansions)
Compost	Grasscycling	100	
	Backyard composting	20	
	Foodwaste in Green can improves	50	
Convert	CT plants developed or expanded	1,200	1,500 TPD capacity at 80% efficiency = 1,200 TPD
			(New or expansion to existing)
			(1 black can; 1 Multi-Family)
COMMERCIAL			
Reuse	(Improved from 2005-2010)	50	
Recycle	Improved source separation	250	
	MRF remainder of wastestream (1)	1,170	Two mixed waste MRFs at 2,334 TPD each (New or expansion)
Convert	CT plants developed or expanded	1,200	1,500 TPD capacity at 80% efficiency = 1,200 TPD
C & D			
Reuse	De-construction grows	25	
Recycle	Onsite source separation	50	
	MRF recovery	100	
	TOTAL	**4,590**	

(1) 9,628 - 4,360 (previous MRF) - (600 source separation) = 4,668 TPD
(2) 2,794 - 1,266 = 1,528 TPD

2015-2020 (Table 5.6)

Residential Sector

The major element will be the development of 3,000 TPD (City-wide) of CT capacity to process the organic fraction of the Black Can material. It is assumed that the feedstock for the CT will be pre-processed by a MRF or autoclave. These CT plants and expansions will be larger than the previous facilities because operating experience and proven performance will support successful design, permitting, financing and operation at a larger scale.

Other elements of the 2015-2020 planning period in the residential sector include:

- Improvement in participation of foodwaste in the Green Can program
- Continued and growing use of thrift and other reuse stores
- Continued and intensified education for the blue can recycling system
- Ongoing and intensified marketing to encourage backyard composting and mulching lawnmowers

Commercial Sector

The first major element is the processing of the final 50% (for a total of 100%) of the mixed commercial wastestream at four new or expanded 750 TPD dirty MRFs. The second major element is the development of two more 1,000 TPD CT facilities to process "post MRF or autoclave" MSW.

Other elements of the 2015-2020 planning period in the commercial sector include:

- Improved product exchanges
- Improved and enhanced source-separation programs

C&D Sector

Elements include:

- Growing de-construction activity
- Increased on site reuse
- Improved and enhanced source-separation programs
- Improved processing technologies

2020-2025 (Table 5.7)

Residential Sector

The major element will be the development of an additional 1,500 TPD of CT capacity to process the organic fraction of multi-family material. It is assumed that the feedstock for the CT will be pre-processed by a MRF or autoclave to minimize contamination and maximize performance.

Other elements of the 2020-2025 planning period in the residential sector include:

- Improvement in participation of foodwaste in the Green Can program
- Continued and growing use of thrift and other reuse stores
- Ongoing education for the blue can recycling system
- Renewed marketing to encourage backyard composting and mulching lawnmowers

TABLE 5.6
(2015-2020)
STRATEGIC PLAN
PROGRAM IMPLEMENTATION AND FACILITY DEVELOPMENT

2015-2020			
WASTESTREAM	**PROGRAM**	**NEW DIVERSION This Period (TPD)**	**NEW FACILITIES NEEDED**
RESIDENTIAL			
Reuse		25	
Recycle	Improved Blue barrel	50	
	Improved multi-family recycling	50	
Compost	Grasscycling	100	
	Backyard composting	20	
	Improved food in green can	50	
Convert	CT plants developed or expanded	2,400	3,000 TPD capacity at 80% efficiency = 2,400 (Black can)
COMMERCIAL			
Reuse	(Improved form 2010-2015)	50	
Recycle	Improved source separation	250	
	Improved MRF recovery	250	
Convert	CT plants developed or expanded	2,400	3,000 TPD capacity at 80% efficiency = 2,400 TPD diverted
C & D			
Reuse	De-construction grows significantly	25	
Recycle	Increase in onsite source separation	25	
	Improved MRFrecovery	25	
	TOTAL	**5,720**	

TABLE 5.7
(2020-2025)
STRATEGIC PLAN
PROGRAM IMPLEMENTATION AND FACILITY DEVELOPMENT

2020-2025			
WASTESTREAM	**PROGRAM**	**NEW DIVERSION This Period (TPD)**	**NEW FACILITIES NEEDED**
RESIDENTIAL			
Reuse		25	
Recycle	Improved blue barrel	25	
	Improved multi-family recycling	25	
Compost	Grasscycling	100	
	Backyard composting	10	
	Improved Green can	25	
Convert	CT plants developed or expanded	1,200	1,500 TPD capacity at 80% efficiency = 1,200 TPD diverted
COMMERCIAL			
Reuse	(Improved from 2015-2020)	50	
Recycle	Improved source separation	250	
	Improved MRF recovery	250	
Convert	CT plants developed or expanded	2,400	3,000 TPD capacity at 80% = 2,400
C & D			
Reuse	De-construction grows significantly	25	
Recycle	Increase in onsite source separation	0	
	Improved MRFs	25	
	TOTAL	**4,410**	

Commercial Sector

The first major element is the development of an additional 3,000 TPD of CT capacity to process "post MRF or autoclave" MSW.

Other elements of the 2020-2025 planning period in the commercial sector include:

- Improved product exchanges
- Improved and enhanced source-separation programs

C&D Sector

Elements include:

- Growing de-construction activity
- Improved and enhanced source-separation programs
- Improved MRF processing and recovery

Facility Development Summary

Table 5.8 on the following page summarizes the new facilities and their expansions that will be required to carry out this blueprint during each of the five-year planning periods. As shown, the City is going to need to carry out a major CT development program over the next 20 years in partnership with the private sector and possibly neighboring jurisdictions for the siting, permitting, design, construction and operation of seven CT facilities ranging in size from 1,250 to 3,000 TPD capacity. This specific number is planned not only to meet the diversion requirement, but also as part of an environmental justice program in which every area of the City and every Council District participates by hosting facilities and programs of one type or another. It also reduces trucking and its attendant air emissions and traffic congestion.

Admittedly, public acceptance issues are serious and will require very close coordination with neighborhood councils, the Council offices themselves, and key stakeholders. In this way, every part of the City will take responsibility for its own waste.

Because the City controls only a portion of Citywide collection, it will be necessary for the City to form partnerships with the private sector for CT facility development for the multi-family and commercial wastestreams. These partnerships could take several forms, with the City possibly contributing:

- Land
- Permitting support
- Assistance in education, public outreach and work with the communities through the Neighborhood Councils
- Financing through the California Pollution Control Financing Authority (CPCFA)
- Guaranteed tonnage from the City collected wastestreams
- Direct contributions to capital costs
- Enhance energy payments through the DWP's RPS program
- Tax incentives

TABLE 5.8
(2005-2025)
STRATEGIC PLAN
FACILITY DEVELOPMENT SUMMARY
(Initial Plant Construction and Expansions)

CT Plant	Plant Capacity Constructed During Period (TPD)				Total Plant Capacity 2025
	2005-2010	2010-2015	2015-2020	2020-2025	
Plant 1	***500***	750			**1,250**
Plant 2	***500***	750		750	**2,000**
Plant 3		***750***	1,500		**2,250**
Plant 4		***750***	1,500	750	**3,000**
Plant 5			***1,500***		**1,500**
Plant 6			***1,500***	1,500	**3,000**
Plant 7				***1,500***	**1,500**
TOTAL CAPACITY					**14,500**

Indicates initial plant construction
Other boxes indicate plant expansions

The private sector could contribute:

- The technology itself and know-how to develop and operate a plant
- Long term throughput, performance and tipping fee guarantees
- Construction and equipment installation
- Start-up testing and ongoing operations
- Revenue sharing on recyclables, compost, fuels, chemicals, and energy sales
- Marketing of products
- Monitoring and reporting

Note that each CT plant and each expansion requires a similar expansion of pre-processing capacity - either a traditional MRF or an autoclave system. It would improve economics, siting, and truck traffic if these facilities are "co-located" adjacent to each other. However, this does not *need* to be the case. Prepared feedstocks from the MRF or autoclave could be trucked to separate CT plants.

Table 5.9 summarizes the existing greenwaste processing facilities and capacity in the City of Los Angeles. As the green can program continues to expand with growth in housing, it will be necessary to keep pace with processing capability. Existing facilities will be able to accommodate this growth. However, the addition of foodwaste to the green can may require revisions to permits, operating procedures, and facility design. Although not without challenges, this is all achievable.

TABLE 5.9
EXISTING GREENWASTE PROCESSING FACILITIES
IN THE
CITY OF LOS ANGELES

FACILITY	LOCATION	CAPACITY (TPD)
Anchorage Composting	San Pedro	33*
Community Recycling Greeenwaste	Sun Valley	1,500
Community Recycling Woodwaste	Sun Valley	700
Harbor Mulching Facility	San Pedro	80
Lake View Terrace Green Recycling Facility	Lake View Terrace	300
Van Norman Dam Mulching Facility	Granada Hills	400
	TOTAL	**2,980**

(*) Converted from cu. yds/day at 3:1

Facility Siting and Permitting

It is beyond the scope of this study to perform an in depth facility siting analysis. However, it is a crucial aspect of this blueprint. Without our ability to successfully site and permit the seven CT facilities needed, as well as the ancillary pre-processing plants (which may or may not be co-located), this plan loses much of its value. Therefore, an overview discussion is warranted.

CT projects will be sited in industrial zones of the City. **Figures 5-12 through 5-14** on the following pages show the zoning map of the City overlain by the six refuse collection districts, the 15 City Council Districts, and finally the 88 Neighborhood Council Districts. Purple coloring designates industrial zoning, with the darker purple representing heavy industrial. As can be seen, there is little heavy industrial zoning outside of four areas: the harbor, LAX, south central LA, and Sun Valley. In fact, industrially zoned land of any type is at a premium. One recommendation is to modify the City Zoning Code to allow CT development in the M-2 zones, with conditions.

Table 5.10 lists the existing facilities in each of the 15 Council Districts, and their relative impact level. Facilities are estimated to have the following impact potential:

Landfill:	Very High
Transfer station/MRF:	High
C&D processor:	High
CT:	Medium
Greenwaste processor:	Medium
Clean MRF:	Medium
Greenwaste mulch distribution center:	Low
S.A.F.E. Depot (for HHW):	Low

Landfills have the highest environmental impacts in terms of the potential for air emissions; water quality impacts; aesthetics; nuisance issues such as dust, odor and litter; truck traffic; and pose the greatest risk in the long term.

Transfer stations, although generally enclosed, handle mixed MSW and can present impacts associated nuisances such as odor, dust, litter, vectors and depending on size, significant truck traffic impacts. C&D processing also carries high impacts even though the material they handle has little putrescible waste in it. Impacts are associated primarily with the fact that the processing is typically outdoors, which can generate dust, noise, and poor aesthetics. Depending on size, heavy truck traffic can also be an impact. One positive mitigation is the use of negative pressure systems to minimize dust and odor problems.

Conversion Technologies carry medium impacts because they are conducted in enclosed buildings and various types of vessels. They appear more as common industrial manufacturing plants than solid waste facilities. However, they too handle MSW and can carry nuisance impacts such as odor. Air emissions from thermal technologies are tightly controlled and information gathered to date by the CIWMB shows that these facilities can meet all current California and SCAQMD standards. Truck traffic can also be an issue depending on facility size.

Greenwaste processing also rates a medium on the impact scale primarily because it is an outdoor operation and as such can create problems with odor, dust and noise. However, because these facilities do not handle MSW, such impacts are on a lower level. Large facilities can involve substantial truck traffic as well.

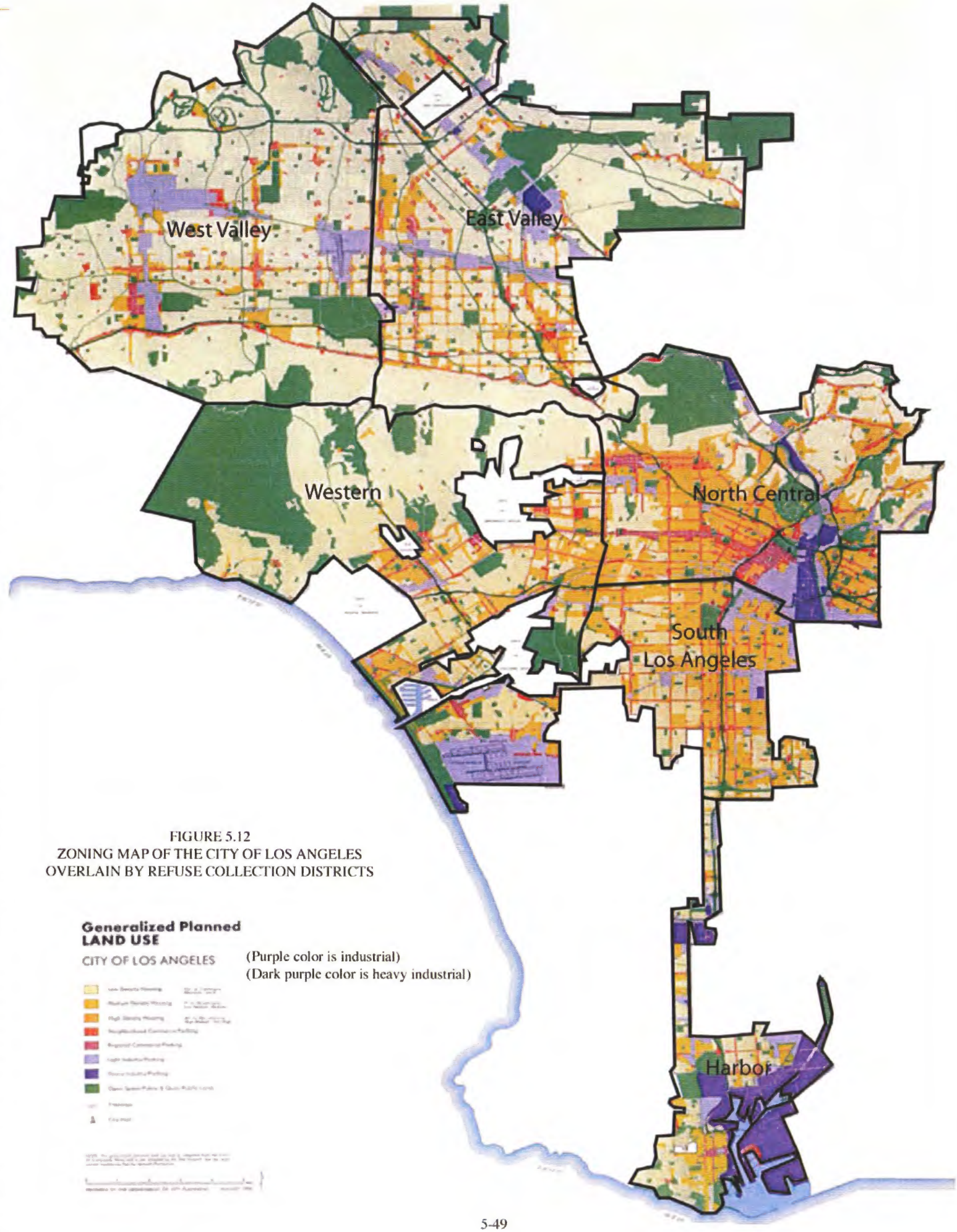


FIGURE 5.12
ZONING MAP OF THE CITY OF LOS ANGELES
OVERLAIN BY REFUSE COLLECTION DISTRICTS

(Purple color is industrial)
(Dark purple color is heavy industrial)

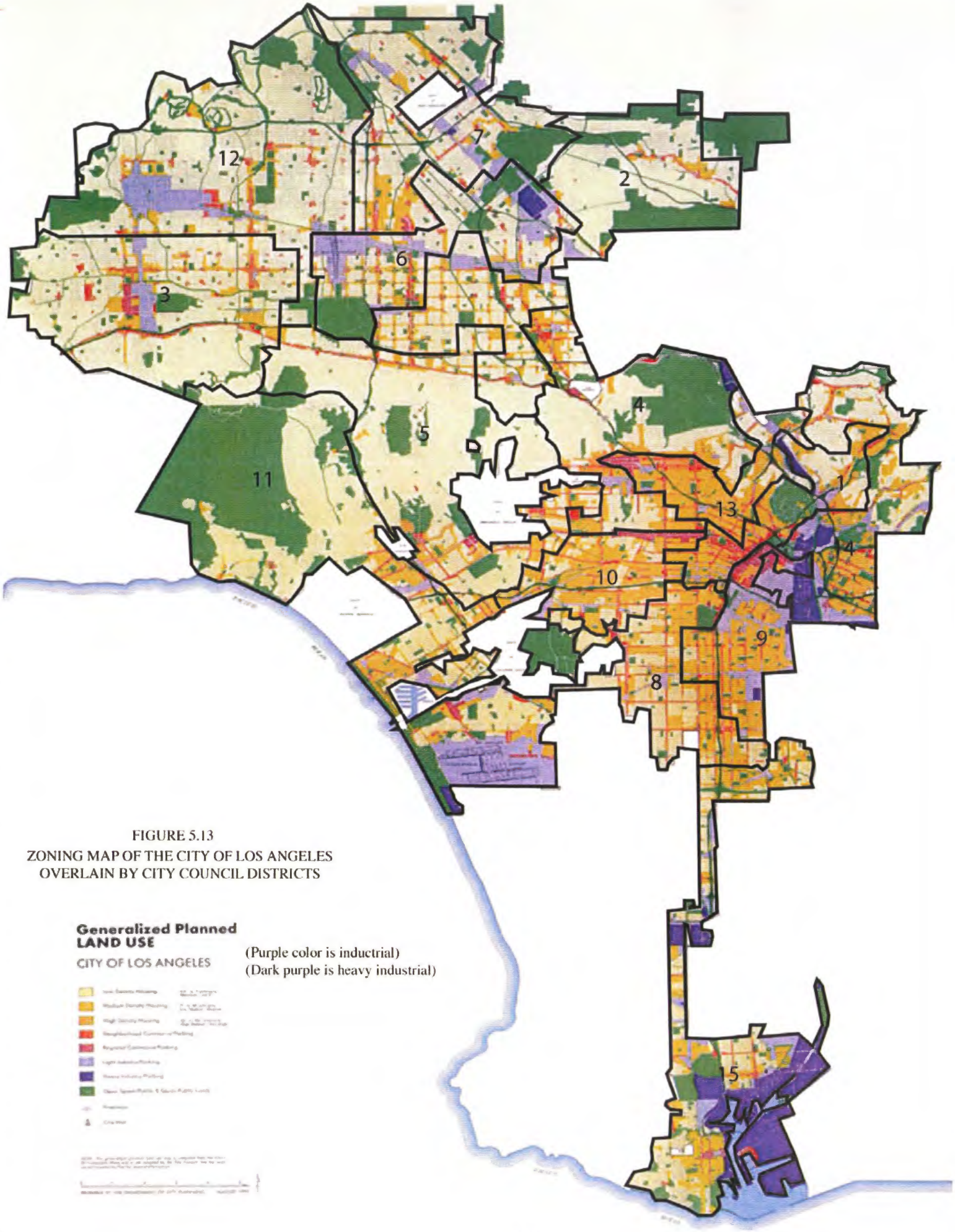
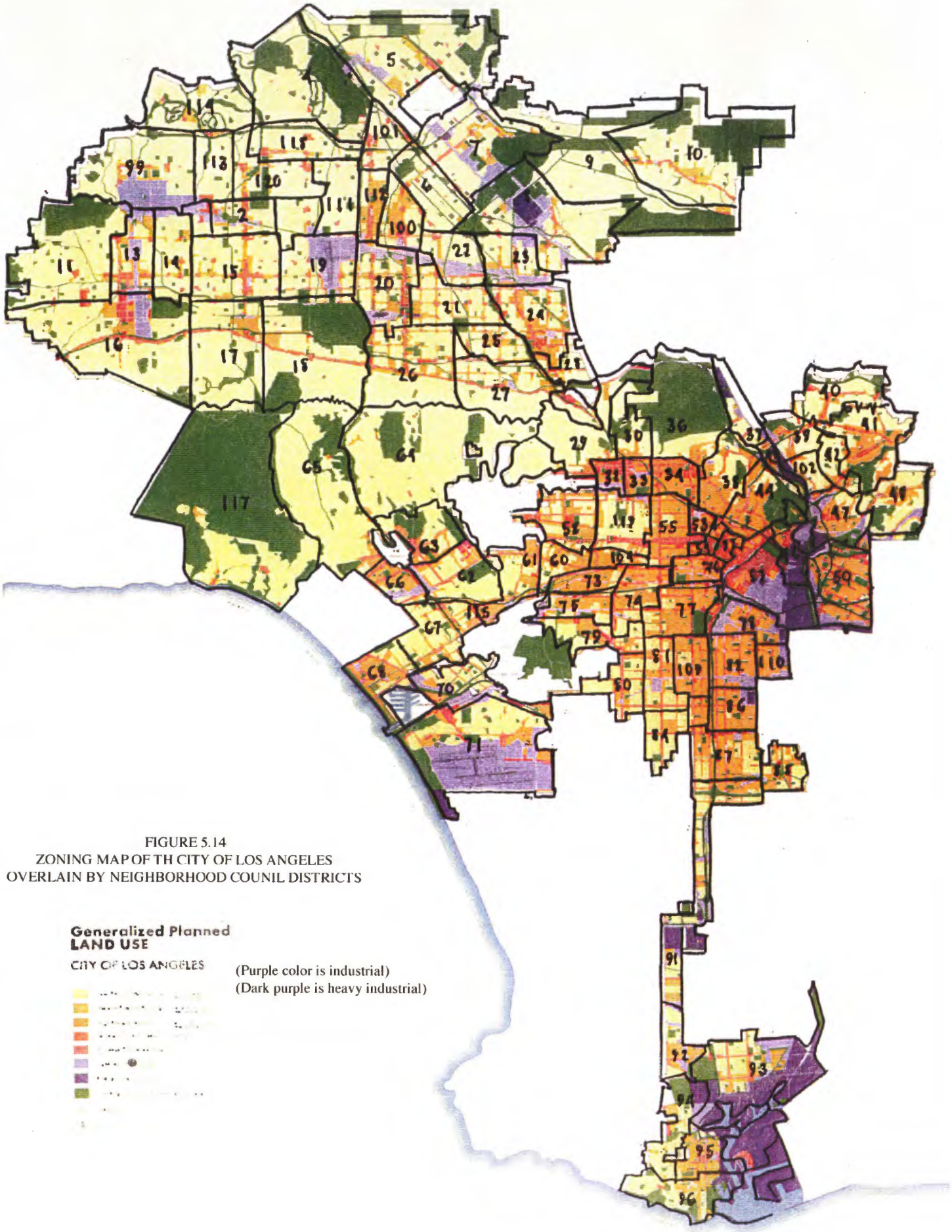


FIGURE 5.13
ZONING MAP OF THE CITY OF LOS ANGELES
OVERLAIN BY CITY COUNCIL DISTRICTS

(Purple color is inductrial)
(Dark purple is heavy industrial)



(Purple color is industrial)
(Dark purple is heavy industrial)

FIGURE 5.14
ZONING MAP OF TH CITY OF LOS ANGELES
OVERLAIN BY NEIGHBORHOOD COUNIL DISTRICTS

TABLE 5.10
MSW FACILITIES
(BY COUNCIL DISTRICT)

COUNCIL DISTRICT	FACILITIES	TYPE	IMPACT LEVEL
Dist. 1	No Facilities		
Dist. 2	American Waste Pendleton Facility	C&D Processor	High
		Transfer Station	High
	Sun Valley Paper Stock	Clean MRF	Medium
	Lake View Terrace Green Recycling Facility	Greenwaste	Medium
	Sun Valley S.A.F.E Center	S.A.F.E. Depot	Low
Dist. 3	No Facilities		
Dist. 4	Griffith Park Composting Facility	Greenwaste	Medium
Dist. 5	UCLA S.A.F.E. Center	S.A.F.E. Depot	Low
Dist. 6	Looney Bins	C&D Processor	High
	Community Recycling & Crown Disposal	C&D Processor	High
		Greenwaste	Medium
		Transfer Station	High
	Sun Valley Paper Stock	Transfer Station	High
	Bradley Landfill West and West Extension	Landfill	Very High
Dist. 7	No Facilities		
Dist. 8	Basic Fibers	Clean MRF	Medium
Dist. 9	Express Recycling	Clean MRF	Medium
Dist. 10	No Facilities		
Dist. 11	Hyperion S.A.F.E. Center	S.A.F.E. Depot	Low
Dist. 12	City Fiber	Clean MRF	Medium
	Van Norman Chipping and Grinding	Greenwaste	Medium
	Sunshine Canyon	Landfill	Very High
Dist. 13	No Facilities		
Dist. 14	Downtown Diversion	C&D Processor	High
	City Fiber	Clean MRF	Medium
	Washington Boulevard S.A.F.E. Center	S.A.F.E. Depot	Low
	Angelus Western Paper Fibers, Inc.	Transfer Station	High
	Central Los Angeles Recycling Center and Transfer Station	Transfer Station	High
	Mission Road Recycling and Transfer Station	Transfer Station	High
Dist. 15	Justis Waste Recycling at BFI/Falcon Transfer	C&D Processor	High
	California Waste Services	C&D Processor	High
	Potential Industries	Clean MRF	Medium
	Harbor Mulching Facility	Greenwaste	Medium
	Gaffey Street S.A.F.E. Center	S.A.F.E. Depot	Low
	Falcon Refuse Center	Transfer Station	High

"Clean" MRFs can be outdoor or indoor operations that handle only source separated recyclables (blue can material primarily). However, there can be a substantial amount of residual MSW mixed in with the recyclables, and the facilities if not properly designed can be unsightly and present impacts regarding noise, dust and litter. Truck traffic can also be a moderate issue, although these facilities are considerably smaller than most transfer stations.

Mulch distribution centers carry low impact levels. These facilities will be small in size to service a local area, will have only moderate traffic, primarily residents picking up material and will involve no onsite processing. Noise, odor and other nuisance factors can be expected to be negligible.

S.A.F.E. Depots for drop-off of HHW are also low impact facilities where materials are containerized and traffic is not significant. With proper design, the depots should not be a problem aesthetically or a nuisance to neighbors.

Another possibility is the siting of a joint use facility in an industrial area of an adjoining city. The current Thomas Guide shows 25 cities that touch the boundary of the City of Los Angeles and that could form a JPA for developing a project that could serve one or more jurisdictions. Likewise, there are 14 County Unincorporated areas that adjoin the City that could also participate or host a facility.

The key to successful siting and project development is to involve the community early and often in the process. This can be achieved through the host City Council office and also through the Neighborhood Councils and their committees. It is imperative, and mandated by the public hearings called for in the permitting process, to have an open and honest discussion with the local community about the project, its importance in the larger scheme of things, its design, operation, potential impacts (both positive and negative), and regulatory controls. The Neighborhood Councils are a good forum for this discussion. Some projects have found it helpful to develop a community working group to meet on an ongoing basis with project developers and provide key input on elements important to the community as a whole.

CT technology is very low in environmental impacts and a positive factor regarding local jobs, renewable energy, reduction of air emissions, and other community benefits. The goal of public outreach is to quickly eliminate any false rumors or information and to build trust between the City, its project partners and the people who live in the area. This can go a long way toward minimizing local concerns. This is particularly crucial with new CT technologies, which will be a mystery to most residents and could conjure up images of environmental horrors - when just the opposite is true.

Of most importance to be conveyed to the community is a clear understanding of the following:

- Truck traffic, its circulation patterns, impacts, and mitigation measures
- Aesthetics (architectural design, landscaping, etc.)

- Nuisance mitigation (control of dust, odor, noise)
- Air emission control technologies
- Stormwater control and reuse
- Other health and safety issues
- Creation of jobs during construction and operations
- Sustainability benefits

Recent experience on other projects in the Sun Valley region of the City has shown that new projects, be they MRFs, C&D processors or CT facilities must strive for a higher level of community involvement, service, and environmental controls such as:

- Attractive architecture with community input on design and color, and incorporating green building elements
- Fully-enclosed buildings with state-of-the-art misting systems and perhaps biofilters for dust and odor control
- Extensive landscaping (preferably drought tolerant)
- Innovative stormwater treatment and recharge
- Onsite generation of electricity for plant operations (via the CT itself or additional solar)
- Participation in ongoing community charity events, schools and parks, etc. – including possible payments into community betterment funds

All this is geared to creating the sense that the local community is getting something back in return for hosting a project, that no matter how well designed and operated, will have some impacts.

CT projects and their pre-processing plants will require four major permits as follows:

- **Conditional Use Permit and CEQA clearance**: This land use permit is the most critical step of the process and will involve not only public hearings in front of the Planning Commission and perhaps City Council, but also the detailed environmental review and clearance through the CEQA process of a Mitigated Negative Declaration or an Environmental Impact Report (EIR). This is where all the local issues must be addressed.
- **South Coast AQMD Permit to Construct and Operate**: This permit will regulate the air emissions from the CT process and from the combustion of biogas in co-gen engines or turbines.
- **Amendment to NDFE**: This process involves the City of Los Angeles, working with the Local LA County Task Force, amending the City's AB939 Non-Disposal Facility Element to include the new projects.
- **Solid Waste Facility Permit**: At this point, it is unclear whether a Solid Waste Facility Permit will be required for a CT facility processing a prepared feedstock, not unlike a paper mill, or glass bottle manufacturing plant. However, the MRF or autoclave on the front-end will definitely need such a permit. This process also involves a public meeting led by the Local Enforcement Agency (LEA). The LEA also drafts the permit, which is reviewed and ultimately concurred upon by the CIWMB. The LEA will

conduct inspections and monitoring to ensure operation according to permit requirements.

Transition over the Next 20 Years

As can be seen in the previous tables and figures, the paradigm shift to resource management and the drive toward zero waste will take a major commitment in time, effort, and money to develop the needed facilities and programs over the next 20 years. During this period, there will be a gradual transition through six basic management systems - from the more simple to the more complex; from a (waste) disposal basis to a (resource) recovery basis; from the "cheapest" system to the best system.

The six interrelated systems are as follows (the italicized portions are those added or modified from the previous scenario):

- Scenario 1: Local Landfills
- Scenario 2: ***Transfer and Haul*** *to* Local Landfills
- Scenario 3: ***MRF***/Transfer and Haul to Local Landfills
- Scenario 4: MRF/Transfer and ***Long-Haul to Distant Regional Landfills***
- Scenario 5: MRF/Transfer and ***Rail-Haul to Remote Desert Landfills***
- Scenario 6: MRF/Transfer, ***Convert and Haul to Local Inert Repositories***

During the transition, several of these, and perhaps all six, will be in operation simultaneously as local landfills close, disposal fees rise, new recycled product markets continue to develop, rail haul is inaugurated by the LACSD in 2009, and other market forces and public policies come into play.

As shown below, during the next 20 year transition period to a "Zero Waste" system, the City of Los Angeles will continue to need significant disposal capacity. This is true even at the 2025 mark, when over 4,000 TPD of inert residual will need to be disposed.

Year	Disposal Capacity Needed (TPD)
2005	**14,300**
2010	**13,400**
2015	**10,500**
2020	**6,600**
2025	**4,100**

It is also important to remember that the City is part of a regional system that currently disposes of over 70,000 TPD. The regional aspects of the system become even more important in the future as landfills in other counties also reach capacity and sharing of resources and systems plays an increasing role.

At present, the City of Los Angeles has no agreement to utilize the LACSD rail haul system, and in fact, that system at 8,000 TPD capacity has the capability to handle only a portion of the 13,200 TPD currently going into the Puente Hills landfill alone, and only about 20% of the tonnage going to disposal throughout Los Angeles County. The history of the County disallowing Los Angeles City the use of their system cannot be disregarded.

The City of Los Angeles does have the ability to operate one major rail-haul project, if it is needed depending upon the speed with which CT facilities can be developed. That project would involve loading shipping containers at CLARTS and shuttling them to the BNSF rail yard. If adjacent land can be purchased, a dedicated intermodal yard could be constructed at the facility itself. Given the overload on the current rail operations in the LA basin, rail haul may be easier said than done – but it is feasible.

POLICY

This blueprint makes the conscious choice to take the "high ground", to do the right thing on a long-term, over-arching cost/benefit basis that takes into account societal and environmental concerns. Much as we did in 1989 with the creation of AB939, we are now establishing a new paradigm for the City of Los Angeles, this time with a "zero waste" target.

The City of Los Angeles is unique in that it controls little of the infrastructure that it depends on for the handling of MSW. City forces collect about one-third of all City-generated waste by servicing single family homes, small multi-family units, and some institutional accounts, but the private sector collects the lion's share of City-generated MSW in the multi-family (complexes larger than 4 units), commercial and C&D sectors.

Likewise, the City controls none of the landfills receiving City-generated waste, and only one of the MRF/transfer stations (CLARTS) that it purchased in 2004. Unlike Orange County that owns and operates all the landfills in their county, or the City of San Francisco with the luxury of having only one franchise hauler that they have considerable control over, the City of Los Angeles must work with many companies in the private sector on both the collection, diversion and disposal sides.

To facilitate the transition from a disposal to a recovery based system, it will be necessary for the City to adopt policies that will either "incentivize" diversion activities, "penalize" disposal, or both. The following is a "laundry list" of possible policies for application in the City of Los Angeles.

Zero Waste

- Adopt this Blueprint as the guiding plan for the City for the next 20 years.
- Adopt a Zero Waste policy.

Blueprint Oversight

- Establish a permanent "RENEW LA" oversight committee responsible for overseeing the blueprint, making needed adjustments and reporting directly to the City Council.
- Instruct the City Department of Environmental Affairs, with support from the B.O.S. and C.A.O., (with the assistance of a consultant, if necessary) to carry on the work started in this RENEW LA plan to research and develop a comprehensive cost/benefit analysis of the six waste management systems (listed on the previous page). This would include not only the engineering aspects but also health impacts, environmental effects, transportation issues, and economic benefits of new job creation.

Source Reduction

- Coordinate at all levels of government to establish joint initiatives with major supermarkets to reduce packaging.
- Sponsor an annual conference or workshop for local manufacturers on resource conservation, recycling, green energy and waste minimization.

California Legislature and the California Integrated Waste Management Board

- Support the CIWMB's ongoing CT research and analysis.
- Support the exclusion of CT facilities from the Solid Waste Facility Permitting Process if they utilize a pre-processed feedstock.
- Mandate that Caltrans use mulch and compost made from California curbside greenwaste material on all its freeway landscape, and other landscaped properties.
- Encourage the legislative mandate that all waste material (residential, commercial or C&D debris) must be "processed" at a MRF or CT facility prior to the residue being disposed.
- Support the phase out of greenwaste as alternate daily cover (ADC) by 2010 to stimulate the development of CT and the best and highest use of resources,
- As CT is phased in, support a landfill ban of the following materials:
    - Greenwaste and tree trimmings: 2010
    - Recyclable material including: cardboard, office paper, newspaper, magazines, glass containers, marketable plastic, steel containers, aluminum containers, bi-metal cans (2010)
    - C&D debris: 2010
    - Any and all organic material: 2020
- Encourage a State Mandate for a "Zero Waste" fee on all tonnage disposed at landfills starting in 2006 at $5.00/ton and increasing $2.50/year thereafter.

Residential Sector

- Mandate reduction in City-collected MSW disposed at the Sunshine Canyon Landfill according to the following schedule:

Year	TPD Disposed
2005	3,600 (current tonnage)
2010	3,000
2015	2,000
2020	1,000
2025	500

- Purchase new or set-aside existing City land for community mulch and compost distribution centers (roughly 1/4 acre each).

Single Family Homes

- Contract for home composting bins made of post consumer material and distribute one to each home with instructional material free of charge; (currently bins are sold at steep discount to homeowners at periodic workshops).
- Set up a hotline and a home composting specialist to assist homeowners with composting questions; also a page on the Bureau of Sanitation's website for online support.
- Institute a variable can rate on the black can with a price break to residents for use of a smaller size (i.e. 30 gallons); simultaneously, initiate an inspection and enforcement/reward program to minimize abuse of the variable can program (by throwing excess trash in the blue or green cans), and to minimize illegal dumping.
- Establish an enforcement program whereby drivers (or other inspectors) randomly inspect blue cans prior to collection, tag those with contamination, issue warnings, or refuse to collect the blue can. Multiple offenses could result in removal of the blue can altogether.
- Modify the green can program to allow household foodwaste (excluding meat, dairy, poultry, fish).

Multi-Family Complexes

- Mandate that by 2010, all private haulers serving apartments and condominiums provide recycling services and demonstrate a diversion level of 25%; this can be achieved via a source separation program or delivery of as-collected material to a certified processor, or both. Work with the haulers stakeholders group to facilitate program development and obtain feedback on implementation.
- Mandate that all developers of new or remodeled complexes submit a recycling plan for approval before building permits are issued covering both construction and ongoing residency.
- Based on the results of the pilot programs, expand the recycling programs to 50% of the City by 2010, and 100% by 2015.

Commercial Sector

- Implement a blue can curbside recycling pilot program for small businesses.
- Increase the BOS recycling rebate for material delivered to MRFs $2.00/ton per year starting at the current base of $25/ton for 2005. As economics shift over time, gradually reduce the rebate until the program becomes cost neutral and the rebate is no longer needed as an enticement.
- Establish financial incentives to encourage private haulers to establish wet/dry collection systems to maximize diversion; with the wet material going to CTs or composting and dry to MRFs or CTs. As economics shift over time, reduce the incentive until it is no longer needed.
- Mandate that all private haulers serving commercial businesses provide recycling services and demonstrate a diversion level of 50%; this can be achieved via a source separation program or delivery of material to a certified processor. Work with the haulers stakeholders group to facilitate program development and obtain feedback on implementation.
- Mandate that supermarkets in the City of Los Angeles switch to biodegradable plastic bags. Also, seek partnerships with supermarkets to offer a nominal discount (5 to 10 cents per bag) for shoppers who provide their own bags.
- Establish an incentive program though which businesses are given a "Green Business" or "Zero Waste" score similar in concept to the A, B, or C rating given to restaurants by the health department. The program, certified by the City Environmental Affairs Department (EAD), would give awards to those companies scoring the highest in resource and energy conservation, recycling, air and water quality control, and other environmental criteria. The companies could then use their rating level for "bragging rights" or marketing advantages.

C&D Sector

- Approve the City's draft C&D recycling ordinance (See **Appendix H**).
- Increase the BOS recycling rebate for material delivered to processors $1.00/ton per year starting at the current base of $10/ton for 2005. As economics shift over time, gradually reduce the rebate until the program becomes cost neutral and the rebate is no longer needed.

Facility Development

- Revise the City Zoning Ordinance to allow CTs by right in all M-2 and M-3 zones with the following conditions:
    - All operations to take place in fully-enclosed buildings with dust and odor control systems and air filtration
    - All stormwater to be collected, filtered and recharged on site
    - All landscaping to be native, drought tolerant species
    - On site mobile equipment to be powered by propane, CNG, bio-diesel or other similar low emission alternative fuel or engine.
    - Project to be developed cooperatively with a working group of the affected Neighborhood Council and other stakeholders.
    - Payment into a local Community Amenities Fund

- Initiate development of the first CT project at a minimum of 500 TPD and expandable to at least 1,500 TPD - possibly co-located with existing MRF/transfer station.
- Streamline and facilitate permitting process for existing and new MRF and transfer facilities to expand mixed waste processing capability.
- Work with DWP to reserve key City-owned industrial land for future CT development to facilitate reaching DWP's RPS goal of 20% by 2017.

Renewable Energy

- Establish a green energy producer bonus from DWP for CTs generating renewable energy.
- Facilitate potential siting of CT facilities at existing DWP power plants, or in close proximity to transmission lines.
- Support DWP's RPS program by providing bonus credit in the RFP selection process for any renewable energy facility located within City limits.

Market Development

- Increase the effectiveness of the RMDZ program and support increased diversion by offering re-manufacturing companies lowered city business taxes (to as low as zero) based on performance for the first 10 years in addition to the existing low interest loans.
- Work with State Legislature to mandate Caltrans use of City-generated mulch on State highway landscaping within the City of Los Angeles

Procurement

- Complete the draft Procurement Ordinance to encourage not only highest recycled content, but highest and best use.
- Continue to mandate City purchase of greenwaste mulch and compost for Parks & Recreation and other departments.
- Increase the "favored" status of recycled content (RC) products by upping the price break on Requests for Bid; likewise for products that are themselves easily recycled or remanufactured.
- Mandate the use of bio-degradable plastic lawn bags for greenwaste, thereby eliminating the major source of contamination for this material going to composting or biological CT plants.
- Mandate that all plastic bags purchased by the City be bio-degradable
- Give additional consideration on the City RFP process for bidders that demonstrate Extended Producer Responsibility (EPR).

Education and Outreach

- Expand business and manufacturing education and outreach program focusing on how waste minimization can reduce trash bills and increase profitability.
- Expand education and outreach programs to single family homes, including stickers for the cans regarding what is and is not acceptable in each can.
- Enroll corporate sponsors and develop private/public partnerships to support new school programs.

Environmental Justice

- Establish an Environmental Justice system whereby each City Council District must participate by hosting existing and new facilities. Facilities are estimated to have the following impact potential:
    - Landfill: Very High
    - Transfer station/MRF High
    - CT: Medium
    - C&D processor: High
    - Greenwaste processor: Medium
    - Clean MRF: Medium
    - Compost distribution facility: Low
    - S.A.F.E. Depot (for HHW): Low
- Mandate that each of the six refuse collection districts host a CT facility.

Funding

- The City of Los Angeles will realize approximately $4 million per year from its percentage of tip fees at the Sunshine Canyon Landfill. This will increase when the City-side expansion of the site comes online in the summer of 2005. This fund should be earmarked for support of alternatives to landfill disposal.
- If franchise programs are required for implementation of portions of the plan, use the franchise fees to fund CT development.
- If current funding through the 10% franchise fee is not sufficient to support BOS programs as part of this plan, increase the fee as needed.
- As a reward or penalty to the private sector haulers, increase or decrease the franchise fee on a graduated scale depending on their demonstrated level of diversion in the commercial and multi-family sectors.
- Apply for California Energy Commission PIER grants for funding of CT facilities producing renewable energy.

EDUCATION and PUBLIC OUTREACH

The Bureau of Sanitation has extensive experience in education and outreach having rolled out the curbside recycling program, and pilot programs for the multi-family, commercial and foodwaste sectors, among a myriad of other programs. What is crucially needed is more funding for the existing education and outreach programs as well as new programs that will target future plans and policies in this blueprint.

As summarized in Chapter 3 on the existing system, the City of Los Angeles through the Bureau of Sanitation and EAD is involved in the following ongoing programs:

- Advertising on the sides of the collection trucks
- Billboard advertising
- Free composting workshops at the Griffith Park Composting Facility
- A monthly newsletter, *An Environmental Affair*, produced by the Environmental Affairs Department
- Free mulch program
- Garden for Kids LA: City of Los Angeles initiative designed to bring gardens to schools throughout the city.

In addition to the City of Los Angeles, the County of Los Angeles, and the CIWMB sponsor education and outreach programs, which can be summarized as follows:

- School curriculums (K-12): Environmental Ambassador pilot program, Generation Earth, LA County Sanitation Districts Education program, Think Earth Environmental Education, and the United Education Strategy Grant program
- Defenders of the Earth (assembly performances by costumed characters)
- Smart gardening workshops: residents can learn about composting
- Community recycling events: waste tires, e-waste, household hazardous waste

Unlike other jurisdictions where the government performs all the collection or works with only a handful of franchise haulers, in Los Angeles, because of the presence of many independent private haulers, much of the outreach and education will be directed at the industry rather than residents. The Bureau of Sanitation is also experienced in setting up such dialogues with industry through its ongoing outreach programs with stakeholder working groups. These workshops are specifically set up to gain input from the industry and interested public and environmental groups on programs the Bureau is considering, and have been successful in the past in garnering industry support and cooperation, to the extent possible in a City with over 140 permitted hauling companies.

Also, it will be very critical to involve the environmental community in the ongoing work to bring this blueprint to fruition. There has been sustained opposition from a couple groups at the State level in Sacramento to CT, primarily centered around fears that CT would undermine existing recycling systems and would carry unacceptable environmental impacts. Although recent work by the CIWMB has proven both these fears to be without substance, there is still work to be done in education and outreach to some important local and State groups, including:

- The Sierra Club
- The Clean Air Coalition
- Environment California
- Californians Against Waste
- Others

Education and outreach will also be vital for our elected officials to bring them up to speed with CT and the new paradigm of zero waste. This will involve many meetings with City Councilmembers and their staffs, the Mayor and his staff, Neighborhood Councils, the DWP, the offices of key State Legislators, and other political and institutional stakeholders, including the Governor's office and members of the CIWMB and SCAQMD.

One key aspect of public education and outreach will be the City's Neighborhood Councils. These strategic Councils will be critical in carrying the vital elements of the plan to their stakeholders. The Neighborhood Councils will also act as focal points and public forums for the successful siting and development of CT facilities and other program components.

It will also make sense to coordinate, educate and update other key players in the region which could include adjoining cities who may want to partner on CT projects with the City of Los Angeles, and also the Los Angeles County Sanitation Districts. Although the latter has historically operated its system to the exclusion of the City, it may be in both parties interest to at least open a dialogue on possible synergies in the future. LACSD has participated in partnership with cities in the past as evidenced by the SERRF project in the City of Long Beach.

Depending on which programs and policies are selected for implementation, areas of focus for future education and outreach efforts in Los Angeles are:

Single Family Homes

- The addition of foodwaste to the green can for single family homes
- Reduction of contamination in blue can recyclables
- The possible addition of a variable can rate for the black can
- Single family home backyard composting and grass-cycling with mulching lawnmowers

Multi-Family Units

- Multi-family recycling in whatever form it takes based on ongoing pilot programs

Commercial Sector (businesses, institutions, etc.)

- Commercial sector source-separation recycling based on pilot program findings
- Expansion of the restaurant and bar foodwaste recycling program

Private Haulers, Landfill Operators and other Stakeholders

- Programs mandating delivery of material to MRFs
- Programs involving AB939 fees
- Programs involving mandatory diversion levels
- Introduction of CT – processes, companies, performance, costs and benefits, European and Japanese experience, environmental impacts

Government, Regulators and Policy Makers

- Education regarding overall system design, operation, goals, etc.
- Liaison regarding possible program and facility partnering
- Issues mitigation and conflict resolution

MARKET DEVELOPMENT

One of the critical elements of any diversion program, be it recycling, composting or conversion, is the value of the products created and the strength of the markets into which they are sold. To a significant degree, the value of these products allows diversion technologies to compete with disposal alternatives.

The sections below discuss markets as they relate to this 20-year blueprint.

Traditional Recyclables

Historically, a substantial amount of material continues to be marketed right in the Los Angeles region, and this trend continues today. Typical "end users" include paper mills, plastics processors, and glass bottle plants.

However, even with this strong local market presence, the traditional markets for paper, cardboard, plastic, glass and metal from the residential blue can and commercial source separation programs continue to strengthen due in large part to the impacts of the growth in the economies and standard of living in China and India. The demand these two countries with the largest populations on earth are creating for recycled fiber, plastics and other commodities has driven the West Coast market over the past few years and is expected to continue to be the major force.

The impact of these two countries in becoming the dominant buyers has actually alarmed some in the industry, concerned that if those markets should ever falter, we will be left holding a tremendous amount of material. With this in mind, and in the interest of rebuilding some of our manufacturing base, it is important that Los Angeles continue to support new companies that can manufacture products out of our recyclables. Products such as plastic lumber, "glassphalt", and others can be made locally, thus creating jobs and also reducing truck transportation and the attendant air emissions and traffic congestion.

This is exactly the intent of the CIWMB's Recycling Manufacturing Development Zone (RMDZ) program - to entice such companies to California, and most importantly for this plan, the City of Los Angeles. In fact, the entire City has been designated an RMDZ, in which the City provides support to companies on permitting and zoning issues and the State provides low interest loans.

The CIWMB and the City are currently working on the development of a database of the companies taking advantage of the RMDZ program or re-manufacturing recyclable material into new products. However, in discussions with City representatives, it was noted that more could be done to encourage manufacturers to locate here. For example, going beyond low interest loans to include possible tax credits and other "business friendly" incentives.

Greenwaste

The markets for greenwaste have been developing over decades in Los Angeles, and both federal and state organizations have been developed to support the industry, such as the U.S. Composting Council, and the California Organics Recycling Council (CORC).

Essentially all greenwaste in Los Angeles is chipped and ground and then used as fuel at biomass power plants, as mulch, or ADC at landfills, plowed into agricultural land, or further processed into compost of various grades and blends and sold into the wholesale or retail markets. The greatest challenge with this material is the sheer volume of it compared to the capacity of the markets. And the tonnage continues to grow each year, outstripping the demand. This has forced processors to look for low level methods to simply "get rid of the stuff", often at significant cost. Examples include the use as ADC, which all agree is not the best and highest use of this material, and as a rough soil amendment when applied directly to agricultural lands.

This trend toward ADC is readily apparent at the State level as 2003 numbers have become available. Although composters and mulchers Statewide processed an astounding 9.8 million tons of greenwaste and wood waste, almost half of it (47%) was used as ADC. Another 20% was sold as biomass fuel, 11% went to the landscape market, 10% to agriculture, 2% to nurseries, and only 1% to CALTRANS. The latter is looked upon as one of the huge virtually untapped markets for processed greenwaste, and the City of Los Angeles should be looking to that agency to play a greater role in stabilizing and increasing the local market.

Unfortunately, greenwaste compost is not a high value product as it is typically low in nutrient concentration, and has not been readily embraced by the agricultural community. However, with the addition of foodwaste to the program, a better product can be made, with a higher fertilizer value, higher pricing, and better acceptance. One shining success has been the City of San Francisco's foodwaste program. 100,000 TPY of greenwaste and foodwaste collected by Norcal, the City's franchise hauler, is composted at the Company's Jepson Prairie Organics facility via windrows and Ag Bags. The product has been embraced by local vintners as an excellent soil amendment for the vineyards.

Even with more of these types of success stories, it is clear that other markets for greenwaste would be very beneficial. This is where CT can play an important role by transforming the material into renewable energy, ethanol, liquefied natural gas (LNG) and chemicals such as acetic acid.

Non-Traditional Markets

One of the great advantages of CT is that it provides new markets for recovered materials and energy. As discussed above, the recovered supply of some of our traditional materials and in particular our greenwaste often exceed the demand, forcing prices down and in some instances a low end and expensive use of the product.

By transforming organic waste into renewable energy, fuels, and chemicals, CT opens up vast new markets in California, where there is a huge demand for such commodities. It also takes some of the strain off our traditional markets for compost, soil amendment and mulch, thereby increasing the value of material sold into them.

Renewable Portfolio Standards

In Los Angeles, DWP has made a commitment to purchase 13% of its total demand in renewable energy by 2010 and 20% by 2017 to meet the RPS target, and at a premium of up to $0.07/kWh. Given that DWP is projecting a peak demand of 5,800 MW in 2010, the RPS commitment is a huge amount of electricity. DWP is actively pursuing new renewable energy sources by issuing annual RFPs and signed its first contract in 2004 with Bio-Converter Park LLC, a greenwaste digestion project.

According to data from the CIWMB, if all the organics in the City of Los Angeles's wastestream that are now being landfilled (approximately 10,500 TPD_5 of organics) were converted to energy in CT facilities, the total MW capacity that could be produced would range from approximately 100 to 340 MW by 2025 depending on the mix of CT utilized. This would represent roughly 5% to 20% of the RPS target.

Not only does renewable energy decrease our demand for foreign oil and new supplies of domestic oil and other fossil fuels, it creates local jobs at the new facilities that would be constructed to generate this electricity.

Ethanol

The U.S. currently produces and consumes roughly 3.5 billion gallons of ethanol per year as a clean burning, home grown transportation fuel additive. This volume is produced by 83 ethanol plants and there are 15 new plants and two major expansions in construction. This will increase production capacity to 4 billion gallons in 2005.

In Washington D.C., the Senate Environmental and Public Works Committee passed the Renewable Fuels Act which establishes a new Renewable Fuels Standard (RFS) that reaches 6 billion gallons by 2012. A bipartisan group of Senators has also introduced legislation that would increase this RFS to 8 billion gallons in the same timeframe.

In California, ethanol is in huge demand with over 700 million gallons per year currently consumed in the State (and much of that, of course, in Los Angeles) under the MTBE additive replacement program. Currently, virtually all this ethanol is made from

corn and comes from out of State. And this is at a very low percentage ethanol blend. If the blend were increased to 10% (E-10) or more (Brazil uses vehicles that burn an 85% ethanol/gasoline blend (E-85) the demand for the product is almost unimaginable.

In addition, hydrogen can be derived from ethanol; therefore these fermentation plants could ultimately support the Governor's "Hydrogen Highway" plan.

The State of Illinois recently announced grant funding to establish new E-85 fueling facilities at retail gasoline stations to encourage the increase use of ethanol. The Governor of Illinois, Rod Blagojevich said in support:

> *"My administration is committed to working to reduce gas prices by supporting ethanol as a practical alternative. With soaring gas prices, ethanol is a cleaner burning and cheaper alternative that also creates jobs in Illinois. We will do all that we can to support ethanol, and to support higher ethanol blends such as E-85"*

The same can be true for California with a focus on utilizing the organic resources in our wastestream, instead of Midwestern corn.

Liquified Natural Gas

LNG demand is also on the rise in California as truck fleets continue to convert to this clean burning transportation fuel to meet AQMD standards. One innovative and sustainable aspect of LNG is that it can be created from the organics in our waste and used to fuel the refuse collection truck fleets, thus closing the loop in a certain way. Projects are first going in at landfills, converting landfill gas to LNG. However, the same technology could also be used at CT facilities to convert syngas and biogas to LNG.

Chemicals

The ability of fermentation plants to produce not only ethanol but a wide array of chemicals creates a connection with a whole new world of almost unlimited potential, the domain of the Dow Chemicals and Duponts of this world.

Clearly, the advent of CT will markedly impact in a positive way the markets for our recyclable and compostable materials. Not only re-creating a healthy balance between supply and demand, but creating local jobs and improving air quality at the same time. Only in this way, will our society and manufacturing base be able to absorb the millions of tons per year of new material that will be diverted in the future under this "zero waste" blueprint plan.

SECTION 6

ECONOMICS OF THE BLUEPRINT

(OPPORTUNITIES TOO GOOD TO WASTE)

"The Los Angeles area must reclaim its commitment to broad-based economic growth and job creation as the single most effective way to lift people from poverty and help them achieve upward mobility."

Lee Hamilton, President and CEO
(Los Angeles County Economic Development Corp.)

OVERVIEW

One of the most compelling rationales for striving to realize Zero Waste goals is the burgeoning economic benefit of recycling. Those with special resonance for the City of Los Angeles include:

- promotion of local economic growth
- creation of local jobs in the construction, design and engineering sectors (with a 7:1 dollar multiplier effect)
- creation of local, permanent operational "Green Collar" jobs (with a 10:1 dollar multiplier effect)
- reduction of traffic congestion and the air pollution caused by trucks traveling long distances to landfills

Achieving Zero Waste could add hundreds of "green-collar" jobs in neighborhoods hardest hit by underemployment, provide growth and training opportunities for those already employed, increase local economic growth through entrepreneurship and small businesses, improve the quality of life and productivity of residents, and increase local government revenues.

How is this possible? What are the economic rationales for recycling and re-use of waste rather than disposal? The recycling and reuse of household and industrial wastes has become more economically compelling because:

- the cost of waste disposal has been increasing (and will reach $100 per ton by 2023 according to a recent LACSD presentation[25]) matching rates already seen on the East Coast
- improvements in technologies for processing and material recovery are continuing
- long-term costs of raw materials are rising

- industrial techniques are replacing artisan methods of disassembly and reprocessing, and
- products are now being designed to be recycled more easily.[1]

Data suggest that disposal and diversion activities have already had a significant impact on the California economy. For example, a 2001 report[2] to the California Integrated Waste Management Board noted that in 1999 the direct and indirect economic impacts of solid waste disposal and diversion were:

- more than $9 billion in sales
- more than $21 billion in total output
- almost $8 billion in total income
- almost $11 billion in value added impacts, and
- more than 179,000 additional jobs

The same report discovered that **diverting** solid waste has a significantly higher impact on the economy than **disposing** of it. As shown in Table 6.1, when material is diverted rather than disposed in California:

- total sales and value-added impacts more than double
- output impacts and total income impacts nearly double, and
- the jobs impact nearly doubles

TABLE 6.1
1999 AVERAGE IMPACTS STATEWIDE (CA) FOR DISPOSAL OR DIVERSION[3]

Category	Disposed	Diverted	Additional Gain from Diversion (Difference)
Total Sales ($/ton)	$119	$254	$135
Total Income Impact ($/ton)	$108	$209	$101
Jobs Impact (Jobs/1,000 tons)	2.46	4.73	2.27

California in general and southern California in particular have been leaders in profiting from the recycling and reuse of residential, commercial and industrial waste. **A 2002 report by the Los Angeles Bureau of Sanitation shows that Los Angeles hosts more than 600 recycling and reuse establishments that employ nearly 8,000 people, generate an annual payroll of $207 million, and gross $1.8 billion in annual revenues.[4]**

Nationwide, according to the *U.S. Recycling Economic Information Study*, the recycling and reuse industry consists of approximately 56,000 establishments that employ more than 1.1 million people, generate an annual payroll of nearly $37 billion, and gross over $236 billion in annual revenues.

This represents a significant force in the U.S. economy and makes a vital contribution to job creation and economic development.[5] Nonetheless, it is clear that the economic potential of this industry has barely been tapped.

Job Creation

As a driver of economic activity, the **recycling** industry mirrors other key industries, such as automobile manufacturing and mining,[6] and indeed in post-industrial countries such as Germany, the waste and recycling industries employ more workers than the steel and telecommunications industries.[7]

Recycling is an integrated system that starts with collection of materials by municipalities and private haulers, involves processing of recycled materials, and leads to manufacturing of new products with recycled content. The economic impact of recycling far outpaces that of the **disposal** of waste because recycling adds value to materials, contributing to a growing labor force. Recycling also provides a large number of jobs that generally pay above the average national wage.

Four major manufacturing industries account for over half of the economic activity of the recycling and reuse industry: paper mills, steel mills, plastics converters, and iron and steel foundries. But the recycling industry also includes smaller companies that are quickly finding a market niche, such as organics composters, and plastic lumber manufacturers.

The **reuse** industry is widespread and ranges from more traditional establishments such as local thrift stores and antique shops to operations such as eWaste recyclers, pallet re-builders, and materials exchanges. Companies such as Urban Ore and ReStore are expanding their operations that take in used material such as lumber, copper piping, plumbing fixtures and building supplies and re-sell them at a discount to the public. As a whole, the reuse industry employs nearly 170,000 workers in more than 26,000 establishments nationwide. The reuse industry also supports an annual payroll of $2.7 billion and generates revenues of approximately $14.1 billion.[8]

At the front end, research and development efforts provide employment to engineers, chemists, and other material specialists. At the back-end, construction workers, architects, and engineers are needed to design and construct the facilities to handle the new supply of discard materials. Jobs will tend to come from small, local businesses because the recycling and reuse industry is diverse and labor-intensive in contrast to highly mechanized and industrialized virgin materials extraction. This involves additional training of traditional jobs such as garbage collector and custodian so that workers have increased skills and knowledge, in effect becoming "green-collar" workers.

For instance, if building deconstruction were fully integrated into the demolition industry, at least 100,000 jobs could be created in this sector.[9] Value is added to discarded materials as a result of cleaning, sorting, and baling. Manufacturing with locally collected discards adds even more value by producing finished goods. For example, old newspapers may sell for $30 per ton, but new newsprint sells for $600 per ton. Each recycling step a community takes locally means more jobs, more business expenditures on supplies and services, and more money circulating in the local economy through spending and tax payments.[10]

On a per-ton basis, sorting and processing recyclables alone sustain ten times more jobs than landfills or incineration. However, making new products from the old offers the largest economic pay-off in the recycling loop. New recycling-based manufacturers employ even more people and at higher wages than sorting recyclables does. Some recycling-based plastic product manufacturers, for instance, employ on a per-ton basis ***ninety times*** more workers than landfills **(Table 6.2).** Product reuse is even more job-intensive than recycling. It is a knowledge-based industry, with a premium placed on accurate sorting and pricing and good inventory and database management.[11]

TABLE 6.2
JOB CREATION
REUSE AND RECYCLING VS. DISPOSAL

Type of Operation	Jobs per 10,000 TPY
Product Reuse	
Computer Reuse	296
Textile Reclamation	85
Misc. Durables Reuse	62
Wooden Pallet Repair	28
Recycling-based Manufacturers	**25**
Paper Mills	18
Glass Product Manufacturers	26
Plastic Product Manufacturers	93
Conventional Materials Recovery Facilities	**10**
Composting	**4**
Landfill and Incineration	**1**

TPY = tons per year
Note: Figures are based on interviews with select facilities around the country.
Source: Institute for Local Self-Reliance, Washington, DC, 1997.

Job Creation in the City of Los Angeles

According to the City of Los Angeles Bureau of Sanitation, the City as a whole now diverts 62% of its waste from landfills.[12] When the City achieves 100% diversion, it can be expected that nearly 6,500 jobs will be created **(Table 6.3).**

TABLE 6.3
JOB CREATION IN LOS ANGELES
WASTE DISPOSAL vs. DIVERSION (*)

	Disposed	**Diverted**	**Positive Gain from Diversion (Difference)**
Total Sales ($/1,000 tons)	$16,088	$343,408	$327,320
Total Income Impact ($/1,000 tons)	$146,016	$282,568	$136,552
Jobs Impact (Jobs/1,000 tons)	3,326	6,395	3,069

(*) based on References 5 and 12

Promotion of Local Economic Growth

Besides diverting waste from landfills, recycling-based manufacturing can also form the basis of a regional revitalization. The Materials for the Future Foundation in California proposes that urban areas such as Los Angeles, experiencing job losses due to declines in core manufacturing industries, could benefit from new manufacturing enterprises that use recycled materials collected in the region. And since secondary materials are generated in population centers, plants that use recycled materials have incentives to locate in urban areas near both the material and labor supplies.[13]

Solid wastes are valuable resources that, if recovered and processed, can strengthen local and regional economies. They promote local economic growth, reduce dependence on foreign products, and encourage sustainable communities.[14]

The reuse industry competes with mass-marketed commodities such as diapers, tires, and plastic, glass, and metal drink containers. Each year Americans spend billions of dollars on these new products. Some of this money remains in communities where the products are purchased, but most leaves the community for the home offices of the corporations that dominate these markets.

By contrast, reuse industry alternatives - cloth diaper services, tire re-treading enterprises - create wealth and jobs for local communities. Such reuse companies tend to be small and locally owned and operated, providing local jobs and increased capital retention. Disposable diapers make up about 4 percent of household waste. They can be recycled as demonstrated by a former Santa Clarita pilot program.[15]

Los Angeles' waste market is one of the world's largest.[16] Its ports, with access to the lucrative Asian markets, give the City economic opportunities that few other U.S. cities enjoy. The City's role as a major exporter of recycled materials has been essential to the growth of its recycling industry. Like most markets, the overseas recyclables market is volatile, being tied closely to the economic conditions of countries such as China, Japan, South Korea, and India. In particular, the rapid and continuing growth of the Chinese economy (approaching 10% per year) has stimulated the demand for American wastepaper, resulting in an even more robust market, especially around the Pacific Rim and in particular for recyclers in the Los Angeles basin.

Los Angeles is also fortunate to operate within state mandates of minimum recycling content for manufacturers of certain products—these two factors make the markets for recycled materials "remarkably robust."[17]

Investment in local recycling collection and processing, as well as strong government policies such as the Recycling Manufacturing Development Zone program in Los Angeles, spurs significant private sector investment in recycling manufacturing and promotes economic growth. The study by the City of New York Bureau of Sanitation[17] tallied this "indirect" impact of recycling on support industries, such as accounting firms and office supply companies, **for a total of 1.4 million jobs supported by the recycling and reuse industry across the U.S. These jobs have a payroll of $52 billion and produce $173 billion in receipts.**

Spending by employees of the recycling and reuse industry also contributes indirectly and adds another 1.5 million jobs with a payroll of $41 billion and produces receipts of $146 billion. The recycling and reuse industry also generated roughly $12.9 billion in federal, state, and local tax revenues, with 30 percent going to city and local governments.[18]

TABLE 6.4
CONTRIBUTION OF RECYCLING AND REUSE TO GOVERNMENT REVENUES: DIRECT EFFECTS REVENUES (IN $ MILLIONS)[19]

Industry Sector	Federal	State	Local	**Total**
Recycling Collection	200	100	100	**400**
Recycling Processing	700	400	300	**1,400**
Recycling Manufacturing	5,400	2,600	2,100	**10,000**
Reuse/ Manufacturing	600	300	200	**1,200**
Total	**6,900**	**3,400**	**2,700**	**13,000**

Reduction of Traffic

The longest-running study of traffic congestion in America, the Urban Mobility Study conducted annually for more than two decades by the Texas Transportation Institute, demonstrates lost productivity experienced by individuals and organizations:

- Each person traveling in peak periods wastes, on average, 62 hours a year, nearly eight full working days, in congestion delays.
- Urban travelers can now expect to encounter congested roadways during seven hours of the day.
- Congestion is becoming more widespread, experienced by nearly 60 percent of urban roadways in 2000.[20]

A city such as Los Angeles may have more than a million waste-related heavy vehicle movements a year: collection trucks, transfer trucks, C&D end dumps, and self-haulers such as landscapers, building contractors, and the general public. Waste can make up to six percent of a large city's total freight movements. There are also freight deliveries of new materials that could be reduced by recycling, especially of aggregates such as sand and gravel. Road traffic can be further reduced through on-site recycling of construction and demolition waste, local composting of organic waste from grocery stores, restaurants, and parks, and siting recycling facilities around rail and water access.[21]

In Los Angeles, motorists spend about 82 hours per year in gridlock. Congestion costs California $20.7 billion a year in lost time, fuel and productivity, according to the Texas Transportation Institute.[22]

Key landfills in the Los Angeles region will close over the next decade including: Bradley West, Puente Hills, Lancaster, and Chiquita Canyon. These four sites represent 31,460 tons of daily permitted capacity, and their loss will result in a capacity shortfall of 12,000 TPD in the region by the year 2014, according to recent LACSD data.[25]

This shortage of local landfill capacity could result in greatly increased transfer and long haul to more distant landfills, and ultimately to rail haul to remote, high desert disposal sites. The added traffic to both freeway and rail systems and the attendant air emissions could exacerbate already critical problems of traffic congestion and air quality.

However, increased recycling and material recovery due to development of more local MRF capability as well as new conversion technology facilities could greatly reduce the traffic associated with future long haul to distant disposal sites. CT plants could be sited in industrially-zoned lands within the City of Los Angeles, and the material and energy recovered also used locally. Literally, millions of truck-miles per year could be saved, and thousands of trucks per day taken off the near-gridlocked freeways.

Another benefit of reducing traffic congestion, especially by a high volume of trucks traveling long distance to remote landfills, is reducing the health costs of air pollution.

The public health costs of pollution from cars and trucks have been estimated in 2003 at between $40 billion and $64 billion per year. The bulk of these public health costs are attributable to premature death, accounting for 77 percent of costs.[23] As one of the cities with the worst air in the country, Los Angeles has the most to gain from reducing emissions from vehicles traveling to distant landfills.

COMPARISONS OF SYSTEMS

At present and over the next twenty years there will likely be six systems for managing the City of Los Angeles' wastestreams, focusing on the MSW from the residential (black can), commercial and C&D sectors still going to landfill disposal. These systems form a progression from simple to more complex, from no recycling to maximum recycling, from a disposal-based system to a resource recovery-based system.

The systems are not mutually exclusive but overlapping in a transitional continuum from one to the next. In fact, all may be occurring simultaneously at some point in the future. These systems are illustrated in **Figures 6.1 through 6.6** on the following pages and summarized below (the italicized portions in the titles represent additions or modifications to the previous scenario):

1. **Local Landfills (Figure 6.1)**
   Historically, direct haul to landfills has been the simplest system in Los Angeles. At one time, there were as many as 20 local landfills from Palos Verdes, to the Sepulveda Pass, to Griffith Park, to Sun Valley. Collection trucks would merely complete their route and drive to the nearest site to dump. This still occurs, but on a decreasing basis due to the closure of most of these easily accessible landfills. Once the one-way haul distance exceeds 15 miles or so, and depending on traffic congestion, it becomes more economical to transfer waste to larger trucks. Hence, the next system.

2. ***Transfer and Haul to* Local Landfills (Figure 6.2)**
   This has become one of the dominant systems in the region as some local landfills have closed resulting in longer hauling distances. In this system, collection trucks tip their loads at transfer stations where the material is loaded into 18-wheel semi trucks for haul to landfills. Typically, anywhere from two to four collection truck loads can be consolidated into one transfer truck load, thus creating large system savings, and reduction of traffic impacts.

3. ***MRF/*Transfer and Haul to Local Landfills (Figure 6.3)**
   To some extent now, and certainly to a great extent in the future, transfer stations will be equipped with processing equipment for recovering recyclable material during the transfer process. This recovery helps meet AB939 targets, provides revenue from the sale of the recyclable materials, and saves the hauling and landfill disposal fees on this material as well. The latter savings (termed "diverted disposal") becomes more important as disposal costs

increase. In the not too distant future, all material may be required or "incentivized" to flow through MRFs for processing before disposal.

4. ***MRF/*Transfer and *Long-Haul to Distant Regional Landfills* (Figure 6.4)**
As older landfills in the urban areas continue to fill and close, long-haul by transfer truck of 50 to 100 miles and even further will be necessary to reach large outlying disposal sites. Some of this system activity is occurring today, and will become more prevalent with the closure the Bradley West, Chiquita Canyon and Puente Hills landfills within the next eight years.

5. **MRF/Transfer and *Rail-Haul to Remote Desert Landfills* (Figure 6.5)**
This is the next system being planned today for implementation by late 2009, principally by the LACSD. Longer hauls, in the 200-300 mile or even 500 to 700 mile distance, lend themselves to rail transport as opposed to trucking. One double-stacked container train can replace as many as 200 semi-trucks. The LACSD has plans in place for two 4,000 ton payload trains a day to be hauled from a new intermodal yard in Puente Hills to the Mesquite Regional Landfill in the high desert. Other transfer stations could also pack shipping containers that could be trucked to this intermodal yard or others for inclusion in new trains. LACSD plans to subsidize the high cost of Waste-By-Rail by a gradually increasing "levelized" fee charged to all tonnage received at the two existing CSDLA landfills (Calabasas and Puente Hills). As calculated by the LACSD, levelized rates reach $35/ton by 2010, $40/ton by 2012, $50/ton by 2015 and ultimately hit $100/ton in 2023, when essentially all waste would be going to rail haul (if CT facilities were not developed).

6. **MRF/Transfer, *Convert and Haul to Local Inert Repositories* (Figure 6.6)**
This is the system highlighted in this report. In truth, it involves much more than these unit functions, combining new programs in manufacturing such as Extended Producer Responsibility, and in reuse such as de-construction among many other policies and programs to begin to minimize the amount of material that enters the wastestream. This system combines intensified source-separation programs and mixed material processing at new and expanded MRFs, with new CT plants that process the residual waste and produce everything from paper pulp to ethanol to bio-based chemicals to renewable energy. The goal of the system is to recover and convert over 90% of the current and projected wastestream, leaving only a small inert residual requiring disposal.

Figure 6.1

Scenario One
Direct Haul to Local Landfill

RENEW LA

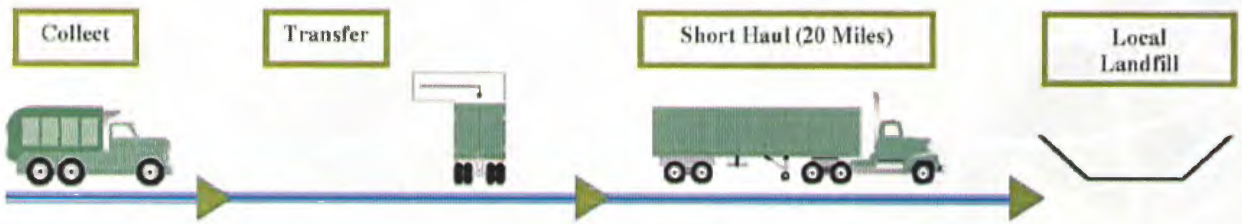
2005 - 2025

A Resource Management Blueprint for the City of Los Angeles

Figure 6.2

Scenario Two

Transfer & Short Haul to Local Landfill



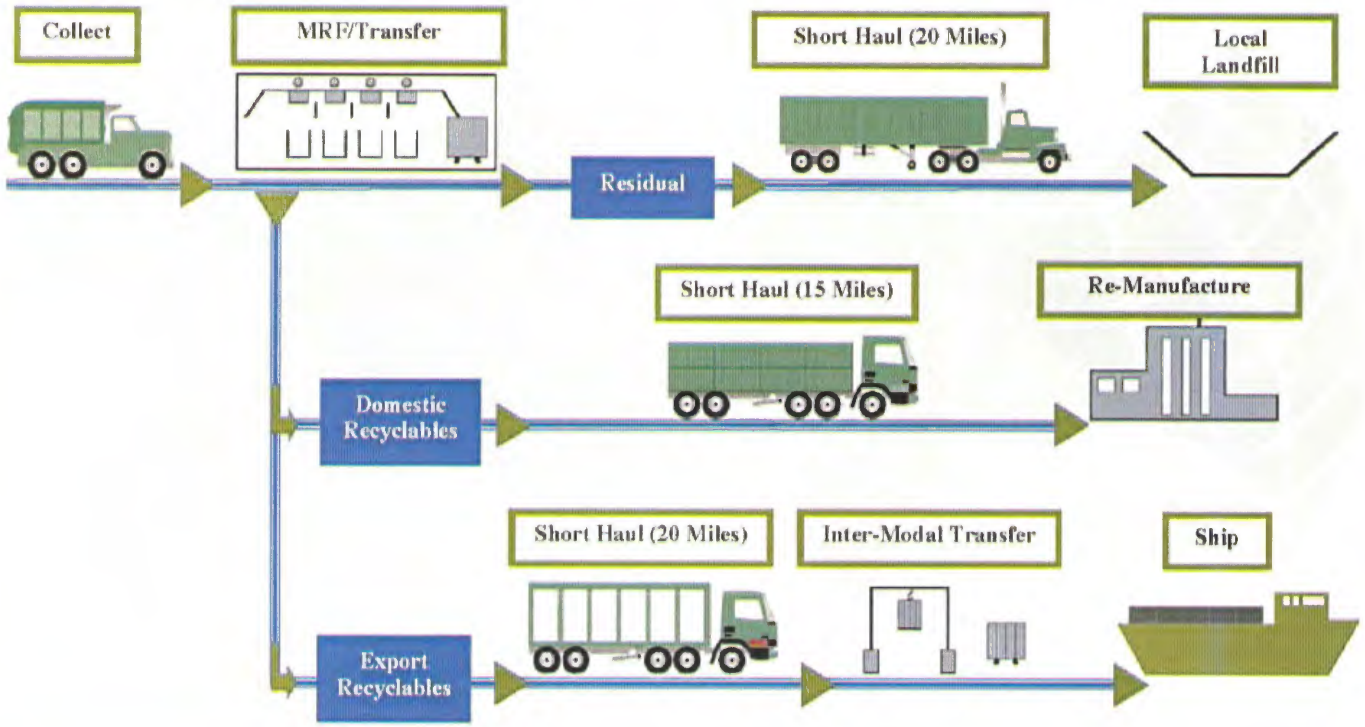
RENEW LA

A Resource Management Blueprint for the City of Los Angeles

Figure 6.3

Scenario Three

MRF/Transfer & Short Haul to Local Landfill



RENEW LA

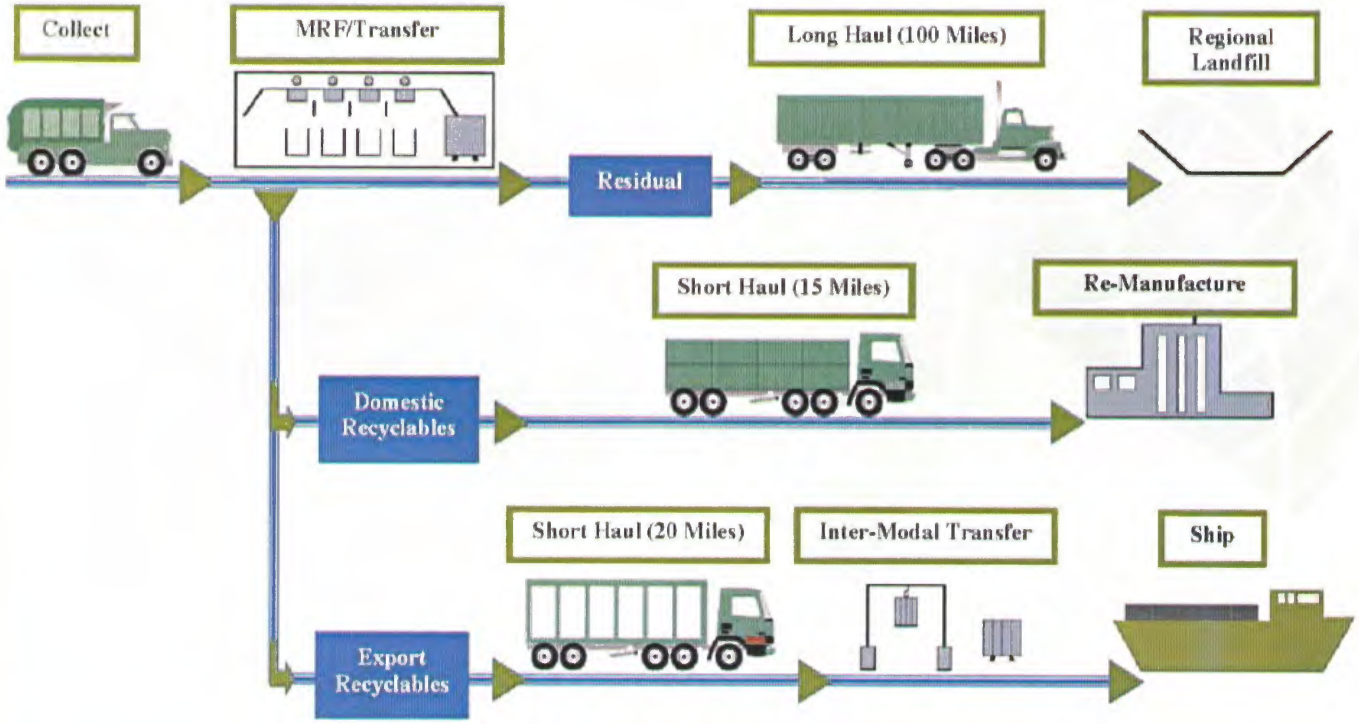
2005 - 2025

A Resource Management Blueprint for the City of Los Angeles

Figure 6.4

Scenario Four

MRF/Transfer & Long Haul to Distant Regional Landfill



RENEW LA

Los Angeles

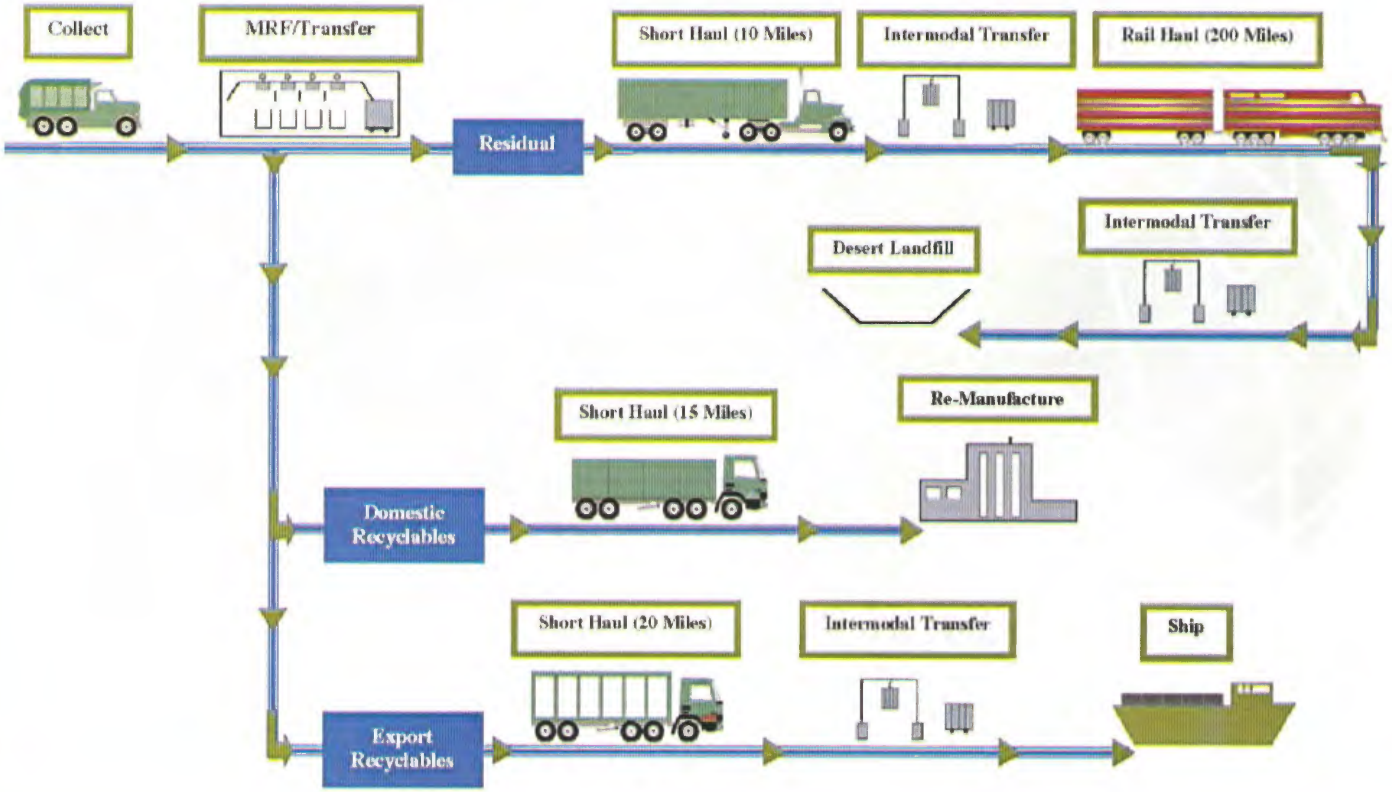
2005 - 2025

A Resource Management Blueprint for the City of Los Angeles

Figure 6.5

Scenario Five

MRF/Transfer & Rail Haul to Remote Desert Landfill



RENEW LA

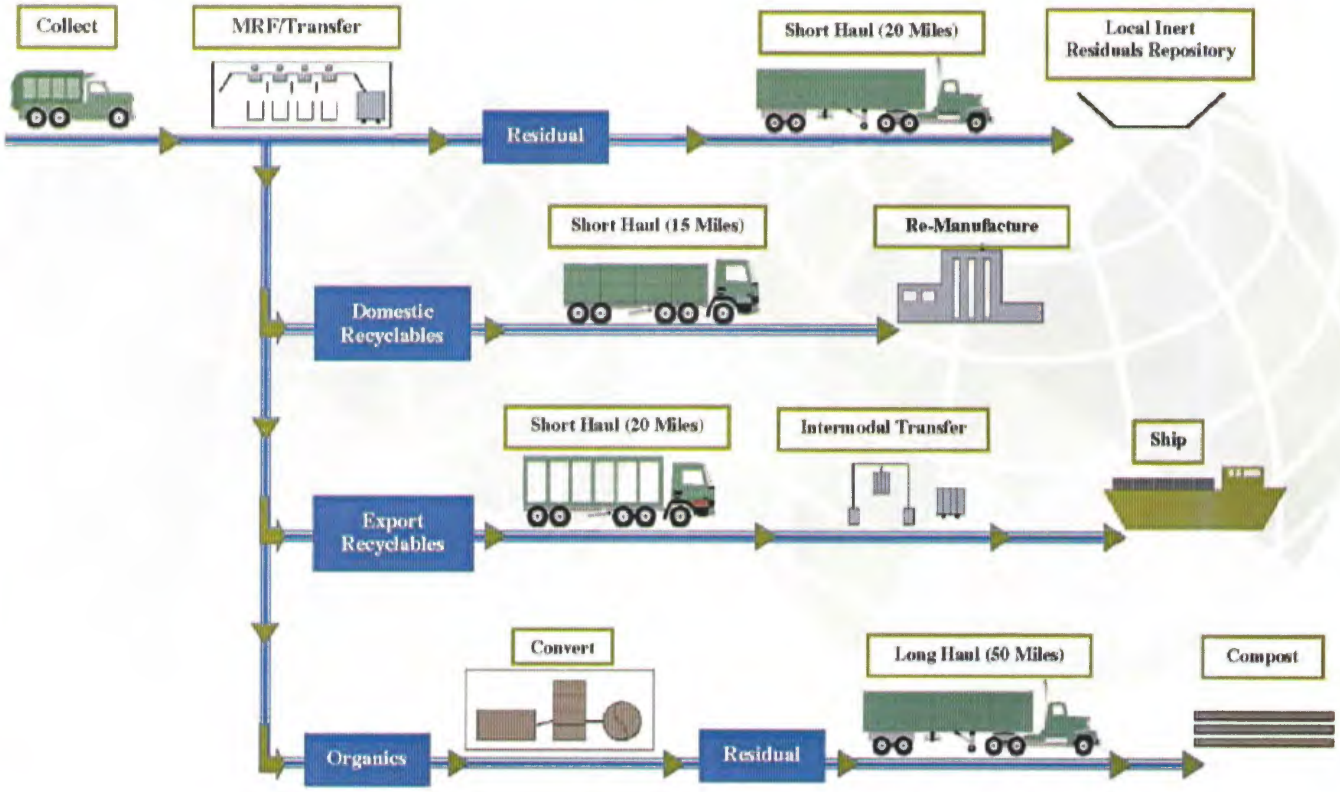
2005 - 2025

A Resource Management Blueprint for the City of Los Angeles

Figure 6.6

Scenario Six

MRF/Transfer & Convert & Haul to Local Inert Repository



RENEW LA

Los Angeles

2005 - 2025

A Resource Management Blueprint for the City of Los Angeles

FIGURE 6.7

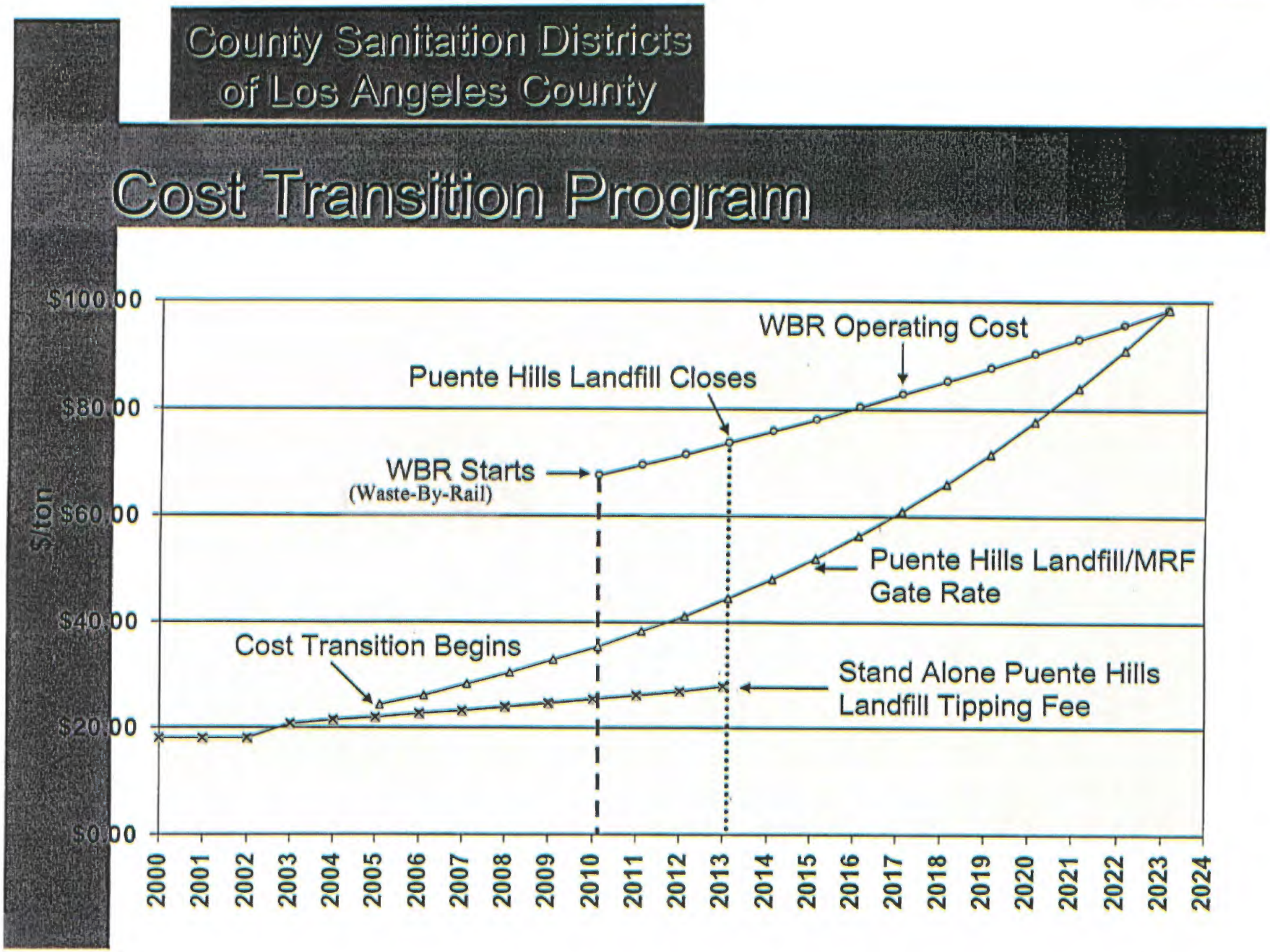

County Sanitation Districts
of Los Angeles County
Cost Transition Program
$/ton
$100.00
$80.00
$60.00
$40.00
$20.00
$0.00
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
WBR Operating Cost
Puente Hills Landfill Closes
WBR Starts
(Waste-By-Rail)
Puente Hills Landfill/MRF
Gate Rate
Cost Transition Begins
Stand Alone Puente Hills
Landfill Tipping Fee

Table 6.5 on the following page provides a summary of average costs per ton for the six basic scenarios. These numbers are approximate and of necessity generalized, and will vary in real world applications depending on facility locations, type of waste handled, facility capacity, type of technology, and other factors. For example, it may actually be less expensive to transfer and long haul (Scenario 4) than to transfer and haul to the local landfill (Scenario 3) due primarily to widely divergent landfill tipping fees. However, the costs in the table do reflect "typical" industry numbers and are intended for comparison purposes to give indications of median values for wider cost ranges within each system.

Cost data for **Table 6.5** was compiled from the following sources:

- Existing tipping fees at local landfills, and bids and actual contract rates received by the City of Los Angeles
- Existing tipping fees at local MRFs and transfer stations
- Truck haul costs from existing transfer stations
- Intermodal and rail haul costs from experienced industry sources in the Pacific Northwest (where rail haul has been ongoing for years); and LACSD engineering projections
- Cost ranges compiled by LACSD for various systems[25]

The hardest costs to quantify are the tipping fees for CT facilities, because with the exception of MSW composting, there are no CT plants in the U.S. To arrive at the conservatively estimated $50 per ton tipping fee, the following information was used:

- Bids received from seven short listed CT vendors for a regional project for Santa Barbara County that averaged $25 per ton
- Discussions and review of pro formas prepared by European and Israeli AD vendors for California projects that ranged from $35 to $60 per ton
- Two finalist bids received by Waste Management, Inc. (WMI) on their Riverside project that ranged from $45 to $55 per ton
- Contract tipping fees for the first commercial autoclave projects in the U.S. ranging from $30 to $45 per ton (projects now in construction)
- A detailed cost analysis entitled, "Feasibility of Generating Green Power through Anaerobic Digestion of Garden Refuse for the Sacramento Area", April 2005 by RIS International Ltd. for the Sacramento Municipal Utility District (SMUD) that researched European plants and developed costs for a project in Sacramento in the $25 to $75 per ton range.
- Estimates based on performance of existing pilot plants in California and Nevada (autoclave, pyrolysis, digestion)
- Actual tipping fees at three operational, full-scale MSW composting plants:
    - Cobb County, GA: $35 per ton
    - Sevierville, TN: $40 per ton
    - Edmonton, Alberta: $33 per ton

TABLE 6.5
RESOURCE MANAGEMENT SYSTEMS
OVERVIEW COST COMPARISON

No.	System	(2005 $) Cost Components	Total Cost ($/ incoming ton)
1	Local landfill	Local Landfill Tipping Fee	25
		Total	***$25***
2	Transfer and Haul to local landfill	Transfer	6
		Haul to Landfill (20 miles)	5
		Local Landfill Tipping Fee	25
		Total	***$36***
3	MRF/transfer and haul to local landfill	MRF processing (*)	15
		Transfer (85% of the material)	5
		Haul to Landfill (20 miles) (85%)	4
		Local Landfill (85%)	21
		Total	***$45***
4	MRF/transfer and long haul to distant regional landfill	MRF processing	15
		Transfer (85%)	5
		Haul to Landfill (50 miles) (85%)	7
		Regional Landfill (85%)	21
		Total	***$48***
5	MRF/transfer and rail haul to remote, desert landfill (LACSD system approx.)	MRF processing	15
		Transfer (85%) (++)	7
		Rail haul to Landfill (250 mi) (85%) (+)	17
		Remote Landfill (85%)	21
		Total	***$60***
6	MRF/transfer and conversion with haul of residual to local inert repository (RENEW LA system)	Feedstock processing	7
		Conversion (**)	50
		Residue Transfer (15%)	1
		Haul to landfill (20 miles) (15%)	1
		Inert landfill (15%)	1
		Total	***$60***

(*) Assumes MRF achieves 15% diversion
(**) Assumes CT achieves 85% diversion
(***) Does not include collection truck haul to the first facility (landfill, transfer station, or MRF)
(+) Includes full intermodal and shuttle operations on both ends
(++) More expensive due to use of compactors vs. simple top loading

Once the first CT plant is built and operating in Los Angeles, actual costs and revenues will be determined. With each subsequent plant, particularly if they showcase a variety of technologies, mature data will be available. One of the main reasons for pressing ahead at this time is to confirm the economics of CT facilities constructed here in Los Angeles and meeting all the requirements and economic realities for siting, permitting, design, operation, environmental controls, residual transport and disposal, power and other product revenues, and public acceptance.

It is likely that the tipping fees for CT facilities will decrease as subsequent plants are brought on line in Los Angeles, other cities in California, and the rest of the U.S. This is a natural progression, demonstrated in other fields of technology, as experience is gained by both foreign and domestic CT vendors in the specific system conditions and the solid waste and recycling industries in localities where the plants are developed.

Also, it is possible that power purchase pricing may increase as DWP and other utilities continue to seek out more renewable energy to meet RPS goals.

The days of cheap landfilling are nearing an end as local landfills close and our basic system transitions from direct haul, to transfer, to MRF/transfer, to long truck haul, to rail haul, and ultimately to conversion technology. In fact, if everything were to go to rail haul, costs would top $100 per ton by 2023, according to the LACSD. Before this summit is ever reached, conversion technologies will come into their own.

THE EXTERNALITIES

Historically, all of our economic analysis of solid waste management systems has focused on tipping fees. **Table 6.5** on the previous page is such an analysis. But in reality, this is an overly simplistic and essentially inaccurate measurement of the true costs and benefits of such systems. A fully-allocated analysis would take into account not only the costs of the system, but the *benefits* as well. Such a model would include the so-called "externalities", those costs and benefits that are real, but generally not valued or quantified in the analysis.

A fully-allocated cost/benefit analysis would include the following:

COSTS

- Traditional costs of facilities and labor (the "Tipping Fee")
- The environmental and health costs of pollution to air, water and land caused by the truck and rail transportation; and the recycling, transfer, conversion and landfill facilities themselves (greenhouse gases, NOx, SOx, particulate, CO, methane, heavy metals, PAHs, ROGs, VOCs, etc.)
- The long-term liability cost of the system as a whole (i.e. potential future groundwater contamination)
- The cost of virgin resource depletion

- The cost of added freeway congestion caused by system truck traffic, and rail system congestion caused by added trains
- The incremental cost to public safety of the additional truck traffic

BENEFITS

- Traditional revenue streams from the sale of recyclables, compost, energy
- The value of new jobs primarily in the manufacturing sector
- The value of new City tax revenue from new local businesses
- The added value of green energy, and local green energy which could reduce the need for costly transmission, infrastructure or pricey contracts
- The value of reducing our dependence on foreign oil
- The value of a sustainable, renewable, system
- The value of a system based on conversion technologies with minimal or net zero greenhouse gas emission

Unfortunately, such an in-depth analysis has never been performed to our knowledge. Admittedly, as important as these elements are, some are difficult to quantify – and thus are typically ignored. Were all the "externalities" to be taken into account, both on the cost and benefit side, advantages would accrue to the new "zero waste" paradigm.

Transportation

The RENEW LA plan, based on enhanced diversion programs and local CT facilities and residual repositories will result in a significant reduction in trucking and rail haul. This is particularly true when compared to future long haul options in which MSW would be trucked or railed hundreds of miles to remote landfill sites. The following will be achieved by the RENEW LA plan:

- Reduced air emissions
- Reduced traffic congestion on freeways and rail lines
- Reduced wear and tear on the roadways
- Reduced truck and rail related accidents

Energy

The seven CT facilities will generate a total off between 100 and 340 MW of power depending on the mix of technologies developed. Using an average value of 220 MW, this green, renewable energy will achieve the following:

- Significant contribution toward DWP's RPS goals
- The reduction of roughly 1 million barrels of crude oil per year
- Reduction in imported oil and related national trade deficit
- The reduction of 400,000 tons per year of greenhouse gases as compared to the use of fossil fuel

Jobs

Development of the seven CT facilities at ultimate buildout (1,250 – 3,000 TPD) can be expected to create approximately:

- 1,400 construction jobs
- 350-500 permanent jobs (admin., management, operation, maintenance, etc.)
- Jobs in the engineering, architecture, landscape design and other support industries

Environmental Quality

In addition to the transportation issues already discussed, CT plants as compared to landfills significantly reduce or eliminate altogether:

- air emissions
- stormwater runoff
- groundwater contamination
- nuisance conditions such as dust, odor and litter
- long term liability risk

SECTION 7

ACTION PLAN

(2005-2010)

INTRODUCTION

This plan is a dynamic system, and it must be so to be effective. No one can forecast the future with exactitude, especially with rapid advances in technology. Therefore, it is not in the City's best interest to lay out program specifics for a twenty year period.

What the City *can* do is lay out a framework for the future, a purpose and a direction – and then a plan for each of the first steps. These first steps are critical in that they start the shift from the old paradigm to the new.

This section lays out the key actions for the next five years (2005-2010). Beyond that, this blueprint should be updated and modified as needed by the RENEW LA oversight committee.

MOST IMPORTANT FIRST ACTIONS

The most important actions for launching this blueprint are listed in **Table 7.1**. Each of these is discussed briefly below.

1. Establish RENEW LA Oversight Committee

The first action will be establishing the RENEW LA Oversight Committee that will carry out the plan and its evolutions. This committee will be empowered by and report to the City Council and Mayor.

2. Adopt RENEW LA Blueprint and Zero Waste Policy

The second action will be to set up the context and structure in which the policies, programs and facilities in this blueprint will become a reality. This will be accomplished by the City Council adopting the RENEW LA blueprint as the guiding plan for the City for the next 20 years, and the Zero Waste Resolution contained in it.

TABLE 7.1
TOP 12 RECOMMENDATIONS FOR ACTION
(2005-2010)

Recommended Action	Acting Body	Timing
1. Establish RENEW LA Oversight Committee	LA City Council	2005
2. Adopt "Blueprint" and Zero Waste Policy	LA City Council	2005
3. Add residential foodwaste to the green can program	Bureau of Sanitation	2006
4. Modify Zoning Code to allow CT by right in M-2 and M-3 zones with conditions	City Council	2006
5. Establish site areas for CTs in each of the Collection Districts	City Council Bureau of Sanitation Private Sector	2005-2007
6. Site and develop 1st and 2nd CT facilities	**Bureau of Sanitation** **City Council** **Private Sector**	**2005-2010**
7. Establish fund from Sunshine Canyon host fees for development of facilities that reduce landfilling	City Council	2006
8. Implement recycling in 50% of the commercial sector	Bureau of Sanitation City Council	2006-2010
9. Mandate time-certain reduction in City MSW disposed at Sunshine Cyn	Bureau of Sanitation City Council	2006
10. Expand multi-family recycling to 50% of the City	Bureau of Sanitation City Council	2006-2010
11. Establish City tax breaks for "Zero Waste" and new re-manufacturing companies	City Council	2005-2010
12. Establish a green energy producer bonus from DWP	City Council DWP	2006

3. Add Foodwaste to the Green Can Program

A relatively simple task, and yet one that can make a significant difference in diversion is to add residential foodwaste to the single family home green can. Organic waste, excluding paper, comprises almost 47% of the single family wastestream. Most of this is foodwaste that could be recovered through this program. Extensive homeowner education will be required.

4. Modify the City Zoning Code to Allow CT Facilities in M-2 and M-3 Zones

To facilitate development of the needed CT plants, the zoning ordinance should be revised to allow CT plants in heavier industrial zones (not M-1 which is light manufacturing). The plants should meet high design and environmental protection standards. For example:

- Located away from residential areas
- Use of recycled content construction materials and other LEED construction practices
- High quality, aesthetic architecture
- Planting of extensive native and drought tolerant landscaping
- Stormwater management
- Energy conservation
- Fully-enclosed operations with state-of-the-art dust, odor and air quality control systems
- Participation in community amenities funds

The facilities would also need thorough vetting by neighborhood councils, local residents and businesses, and other stakeholders.

5. Establish Site Areas for CT Facilities in Each Collection District

One of the most critical aspects of the RENEW LA plan is the ability to site new facilities, and to site them in several areas of the City to allow for shorter truck hauling and to ensure an environmentally just system. The City can take the lead in this regard by first looking at City controlled industrial parcels on DWP power plant sites and other City Department lands. A concerted, open and fully participatory process will be essential in winning over the public for seven such sites across the City. However, once site selection and public acceptance have been achieved, the hardest part of implementation is over.

6. Site and Develop the 1st and 2nd CT Facilities

This is perhaps the most critical of first actions in not only rolling out the RENEW LA blueprint, but catalyzing the development of CT in California and the rest of the U.S. The greatest single impediment to developing the new paradigm is the fact that there are no operating CT plants in North America except for MSW composting (although two autoclave projects are in construction and should be operational by the 4th quarter 2005). Once a first plant is built, it will allow regulators, political leaders, the waste industry, and Los Angelenos to see first hand the performance, environmental controls,

and costs of these facilities. It should also demonstrate the ability of these plants to support the existing diversion infrastructure with even more recycling and production of green energy.

Approximately two years after the start of development of the first CT plant, the second should be launched. It would be particularly valuable if the second plant were a different technology than the first (a thermal process if the first was biological – and visa versa). This would demonstrate another successful technology, diversify the end products, and provide a model for comparison. As previously discussed, this plant would be located in another of the six refuse collection districts.

7. Establish fund from Sunshine Canyon host fees

The City of Los Angeles will realize approximately $2 million per year in revenues from its percentage of tip fees at the Sunshine Canyon Landfill. This large sum of money will increase as the City-side expansion comes online in the summer or fall of 2005. It is necessary and in the best interest of the City of Los Angeles to develop alternatives to landfilling that preserve precious resources and extend their beneficial use, rather than wasting them through disposal.

Therefore, the City should draft an ordinance placing this revenue in a special fund to be used solely for the development of facilities that reduce the City's dependence on landfilling in general, and ultimately eliminate the City's need for use of the Sunshine Canyon site in particular.

8. Implement Recycling in 50% of the Commercial Sector

This is the largest wastestream related to material still going to the landfill, even though significant diversion is occurring. The program could involve increased rebates to haulers delivering material to MRFs for processing, new source-separation programs, new business education programs, and perhaps mandates at the State level that all commercial waste be processed for recovery of recyclables before landfilling.

9. Mandate Time-Certain Reduction in City MSW Disposed at Sunshine Canyon

To demonstrate commitment to a zero waste plan and improved diversion, a mandate will be approved by the City Council reducing the tonnage of City-collected MSW disposed at the Sunshine Canyon landfill according to the following schedule. This reduction will be achieved by a combination of increased diversion from existing recycling programs, implementation of new source-separation programs, increased mixed waste processing at MRFs, development of the first CT facility, and possibly MRF/transfer and haul to other landfills.

Year	TPD Disposed
2005	3,600 (current tonnage)
2006	3,000
2007	2,000
2008	1,000
2009	500

10. Expand Multi-Family Recycling to 50% of the City

Based on results from the ongoing pilot programs, the Bureau of Sanitation will expand the most successful to other apartment and condominium complexes. Again, it will be critical to work in conjunction with the private hauling community as they service the lion's share of the multi-family units. It may be necessary to set up a franchise system if it proves too difficult to enlist the cooperation of the private haulers. In addition to source separation programs, MRFing of mixed material may be employed, particularly in the lower income areas where the pilot source separation programs have not performed well.

11. Establish City tax breaks for "Zero Waste" and new re-manufacturing companies

As more and more material is diverted through the RENEW LA programs, new re-manufacturing plants that can convert the material to useful products will be needed. To entice them to come and establish businesses in Los Angeles, the City should provide added incentive by eliminating City taxes for the first 10 years. In addition, companies that gain City certification by the EAD as achieving high levels of recycling will receive City tax reductions commensurate with the levels of diversion achieved. The ultimate designation as a "Zero Waste" company could result in zero City taxes for the following year.

12. Establish a green energy producer bonus from DWP

As an incentive for CT companies to build projects in the City, a special bonus payment per kWh should be established. The impact of elevated payments to CTs for a total of 100-200 MW of capacity will have very little effect on overall rates in a system that generates thousands of MW with conventional fuels; however, it would have a profound, positive effect on the financial performance of the CT plants themselves.

MOTIONS

In order to launch the RENEW LA plan, Councilman Greig Smith is proposing that the motions on the following pages be adopted by the Los Angeles City Council.

TO CITY CLERK FOR PLACEMENT ON NEXT REGULAR COUNCIL AGENDA TO BE POSTED | #64

MOTION

The RENEW LA Resource Recovery Blueprint is an expansive and extensive document that sets forth bold goals for the City of Los Angeles – moving from an outdated paradigm of solid waste management, to a new paradigm of maximum resource recovery.

This paradigm shift is made possible by a combination of recycling, reuse, diversion and use of conversion technologies to take formerly waste materials and return them to beneficial use in the form of green energy, alternative fuels or other manufacturing feedstocks and chemicals.

The RENEW LA blueprint is a step by step plan to reduce LA's dependency on landfilling, thus preventing the associated air and groundwater pollution, while creating a "green collar industry" that creates economic development and preserves precious virgin resources.

As the RENEW LA Resource Recovery Blueprint contains many crucial milestones toward the accomplishment of this goal. It is imperative that it be shepherded to fruition by stakeholders including, but not limited to: The Bureau of Sanitation, DWP, The Environmental Community, Regulatory Officials, The Waste Industry, Renewable Energy Advocates and Local and Community Officials, including Neighborhood Councils.

I THEREFORE MOVE: That the City Council create and empower the RENEW LA Oversight Committee (RLAOC) to shepherd the policies and programs proposed in the RENEW LA resource recovery blueprint. The committee will oversee the plan's goals to eliminate the need for landfills while maximizing resource recovery, utilizing highest and best use of resources, including the creation of renewable energy, alternative fuels and useful feedstocks for manufacturing.

I FURTHER MOVE: That the RLAOC report back to Council on progress made toward accomplishing the milestones set forth in the report on a regular basis and revise the report, as necessary when technology, legislation or progress mandates.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: _____

AP

[redacted] 7 2005

05-1273

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

JUN 2 8 2005

MOTION

The City of Los Angeles collects solid waste from single family homes and apartment buildings with less than four units. Using a three-barrel system that requires residents to separate recycleables into a blue can, greenwaste and yard trimmings into a green can and the remaining trash into the black can for disposal.

This system has allowed the City of Los Angeles to receive a 62% diversion level, among the highest in the State of California. Beyond that, the City has set a goal of 70% diversion by 2010. We need to move beyond the concept of "waste management" to a new paradigm of maximum resource recovery.

It is imperative that the City of Los Angeles adopt and implement a far-reaching and ambitious plan. This plan should provide a blueprint to a City that is not dependent on landfills for disposal, but also strives further, to create renewable, green energy, ("green collar jobs") from incentivizing local recycling and re-manufacturing industries.

Doing so will preserve natural resources, reduce the traffic, emissions and other environmental hazards associated with landfilling and will provide a local, responsible and environmentally just plan for resource recovery, by returning formerly wasted resources back to beneficial use.

R.E.N.E.W. LA (Recovering Energy, Natural Resources and Economic Benefit from Waste for L.A.) is such a plan.

I THEREFORE MOVE that the City Council adopt the RENEW LA plan as a resource management blueprint for the City of Los Angeles for the next 20 years.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: _____

05-1273-S1

JUN 2 8 2005

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT
JUN 2 8 2005

MOTION

Much as AB939 did to launch the recycling programs which have lead to a prolific recycling rate in the City of Los Angeles of over 60%, a new blueprint is needed to reach the ultimate platform - "zero waste". As defined by the California Integrated Waste Management Board (CIWMB), a zero waste philosophy includes a broad array of programs and policies within an overall framework of sustainability:

- Promoting the management of materials to their highest and best use
- Protecting public health and the environment
- Maximizing waste reduction and recycling
- Ensuring that products are made to be reused, repaired or recycled
- Promoting front-end design efficiency in manufacturing to conserve virgin materials and reduce waste
- Harnessing the energy potential of "waste" by using new technology to convert the material directly into green fuel, gas, or electricity

The goal of zero waste as defined in the RENEW LA plan is to reduce, reuse, recycle, or convert to beneficial use, the resources now going to disposal so as to achieve an overall diversion level of 90% or more by 2025, and to dispose of only inert residual.

I THEREFORE MOVE: That the City Council adopt a Zero Waste goal as defined by the California Integrated Waste Management Board and direct the Bureau of Sanitation to expand existing programs and create new programs, as necessary to accomplish this goal, using the RENEW LA blueprint as a guiding document.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: _____

05-1366
OLD CF 98-2289

JUN 0 8 2005

JUN 2 8 2005

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

JUN 2 8 2005

MOTION

The City of Los Angeles has achieved a commendable 62% AB 939 level of diversion from landfilling, one of the highest in the State.

Even so, we are still disposing of 3,600 tons per day of municipal solid waste (MSW) in landfills. Amazingly, up to 80% of what is currently disposed of in landfills is organics. Excluding paper, this organic component, or foodwaste, comprises almost 47% of the single-family wastestream.

These organics are vital for the regeneration of soil used for agricultural purposes and as a soil amendment can reduce water need by up to 30%, while increasing yield when land applied.

The City of Los Angeles already has the infrastructure in place to divert these organics. Instead of disposing of them in the black can, residents should be encouraged to add them to the green can. Doing so will require re-education of residents, as well as assisting current greenwaste vendors with obtaining permitting to accommodate the addition.

I THEREFORE MOVE that the City Council direct the Bureau of Sanitation to devise a plan for adding foodwaste to the green bin, including a plan for educating residents and securing vendors to accommodate the addition and report back to Council within 120 days.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: _____

05-1365

JUN 2 8 2005

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

JUN 2 8 2005

PLANNING & LAND USE MANAGEMENT

MOTION

The City of Los Angeles is required by the State of California to divert an increasing percentage of waste from landfills. In addition, the State of California's Renewables Portfolio Standard (RPS) mandates that investor-owned utilities (IOUs) increase their annual retail power sales from eligible renewable resources by at least 1% per year with a goal of attaining 20% aggregate annual retail sales by 2017. Though municipal facilities like LADWP are currently exempt from the specific provisions of the RPS, SB1078 requires municipal utilities to develop renewables programs in the spirit of the legislation. In addition, the City has voluntarily set a 20% RPS goal by 2017.

Further, the City of Los Angeles currently encourages recycling by providing single-family, residential, curbside (blue can) pick-up, as well as requiring all City departments to recycle. In support of the necessity for recycling, recycling facilities have achieved a by-right designation in "M," or manufacturing zones, with certain restrictions.

There are currently many technologies able to convert the organic waste materials left after a materials recovery process and that are not suitable for composting, into green energy, alternative fuels and other useful products. These technologies include, but are not limited to: hydrolosis, gasification, pyrolysis, fermentation and anaerobic digestion. These methods differ from incineration and traditional waste-to-energy approaches because they do not require combustion, making them "clean" technologies.

In as much as it is not only good public policy, but also an ever-increasing need to produce energy from renewable sources,

I THEREFORE MOVE that conversion technology and emerging renewable energy facilities be given by-right status in the M2 and M3 zones, subject to all applicable City of Los Angeles planning code restrictions, as well as all applicable Federal, State and Local regulations for air and water quality standards.

I FURTHER MOVE that the Planning Department and Bureau of Sanitation work together to identify appropriate siting opportunities in each of the six City wastesheds, (West Valley, East Valley, West Los Angeles, North Central, South Los Angeles and Harbor) with an eye toward environmental justice.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: _____

JUN 2 8 2005

05-1336

COMMERCE, ENERGY & NATURAL RESOURCES

MOTION

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

JUL 0 5 2005

The City of Los Angeles has mandated compliance with State law that asks non-municipally-owned utilities to attain 20% of their energy from renewable sources by 2017. The DWP and City Council have adopted a similar goal.

To achieve such a high renewable portfolio, the City of Los Angeles will need to create or contract to obtain hundreds of megawatts from a multitude of sources. Ideally, we will obtain the bulk of this energy locally, for ease of transmission, as well as local economic factors.

Conversion Technologies have the ability to convert previously disposed of municipal solid waste (MSW) into renewable, green energy; alternative fuels, and valuable manufacturing feedstocks.

Inasmuch as there is a nexus between our need to reduce the amount of waste disposed of in landfills and our need to create a large amount of renewable energy, the DWP and Bureau of Sanitation should be coordinating efforts to maximize the results for both entities and the ratepayers of the City of Los Angeles.

Since capital costs for conversion technologies may be costly for private companies seeking to locate within the City of Los Angeles and utilize our MSW for the creation of renewable energy, incentives should be created to encourage businesses to do so.

I THEREFORE MOVE that the City Council direct the DWP to establish a per kWh "green energy producer bonus" payment for conversion technology companies that locate within the City of Los Angeles and use City-generated MSW to create renewable energy.

AP

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: Tony Cardenas

JUL 0 5 2005

05-1406

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

JUL 05 2005

MOTION

The City of Los Angeles will see approximately $4M in revenues derived from its percentage of tip fees derived from the Sunshine Canyon Landfill. This is a large sum of money and will increase as the City-side expansion is expected to come online within the next several months.

It is necessary and in the best interest of the City to develop alternatives to landfilling that preserve precious resources and extend their beneficial use, rather than wasting them through disposal. It is, therefore, advisable for the City to direct this funding to a special fund established for this purpose.

As a worldwide leader in recycling, renewable energy, green building and resource recovery, the City of Los Angeles continues to be at the forefront of developing and enlisting conservation, technology and industry to reinforce these priorities. As such, we should be directing guaranteed and steady funding to the furtherance of these ideals.

I THEREFORE MOVE that the City Attorney be instructed to draft an ordinance establishing a special fund to capture host fees attributed to tipping fees from the Sunshine Canyon Landfill, to be used solely for the development of facilities that reduce the City's dependence on landfilling.

I FURTHER MOVE that this fund be used to develop facilities that return the maximum amount of resources to beneficial use by recycling, resource recovery or conversion to renewable energy or fuels.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

AP

SECONDED BY: Tony Cárdenas

05-1405

JUL 05 2005

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

JUN 2 8 2005

MOTION

The Bureau of Sanitation has been extremely proactive in exploring ways to increase recycling in the commercial sector without being unduly burdensome to businesses. Currently, the Bureau offers free consulting services to Los Angeles Businesses to assist them in reducing their waste, and the costs attributed with private hauling and disposal.

Additionally, the Bureau is currently conducting a commercial recycling pilot focusing on sectors that produce large quantities of paper and cardboard "waste." Concurrently, BOS is recycling restaurant foodwaste in a pilot that uses the organic material to create high quality compost.

It is in the best interest of the City of Los Angeles to recycle as much as is possible, which includes doing what is necessary to recover recycleables from the commercial sector, including retail, office, hospitality, manufacturing and industrial businesses for which the City does not currently provide recycling services.

A Commercial Recycling program increases AB 939 diversion levels, reduces landfill disposal, increases recycling revenues and preserves virgin resources.

I THEREFORE MOVE that the Bureau of Sanitation work with the business community to expand Commercial Recycling to at least 50% of the City by the year 2010 and create a plan for inclusion of the remainder by that time, including a time frame for completion.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: _____

05-1318-S1

JUN 2 8 2005

JUN 2 8 2005

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

MOTION AD HOC Business Tax Reform

In order to achieve maximum diversion from landfilling it is necessary that all sectors in the City participate. Of particular importance, is the business community, who can play several roles in achieving a reduction in the waste and pollution associated with landfilling.

Reducing dependence on landfilling requires more and more material to be recycled or reused. Voluntary reduction in disposal by businesses should be incentivized and rewarded.

Additionally the City should take steps to insure a strong market for recycled materials by incentivizing the creation of businesses that specialize in remanufacturing of recoverables/recycleables diverted from City of LA MSW. This policy also encourages the creation of so-called "green collar" jobs which can considerably strengthen the City's tax base.

I THEREFORE MOVE that the Ad Hoc Business Tax Reform Committee establish an incentive plan for a reduction in City Business Tax for new "remanufacturing" businesses that locate in Los Angeles and utilize City of LA recycleables, convert waste material to useful products, or use MSW as a feedstock for a manufacturing or industrial process.

I FURTHER MOVE that existing or new companies that achieve certified high levels of recycling or reuse receive City tax reductions commensurate with levels of diversion achieved.

I FURTHER MOVE that both incentive programs be implemented prior to fiscal year 2010-2011.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: _____

05-1367

JUN 2 8 2005

COMMERCE, ENERGY & NATURAL RESOURCES

MOTION

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

JUL 0 5 2005

The City of Los Angeles has mandated compliance with State law that asks non-municipally-owned utilities to attain 20% of their energy from renewable sources by 2017. The DWP and City Council have adopted a similar goal.

To achieve such a high renewable portfolio, the City of Los Angeles will need to create or contract to obtain hundreds of megawatts from a multitude of sources. Ideally, we will obtain the bulk of this energy locally, for ease of transmission, as well as local economic factors.

Conversion Technologies have the ability to convert previously disposed of municipal solid waste (MSW) into renewable, green energy; alternative fuels, and valuable manufacturing feedstocks.

The first and most critical step toward maximizing the City's ability to capitalize on the clean energy-producing potential from our municipal solid waste, as well as reduce our dependence on landfilling and preserve precious resources, is to identify appropriate sites to locate conversion facilities that can make these goals attainable. This includes, but is not limited to identifying appropriate City and DWP property, as well as examining opportunities to collaborate with bordering cities that share these goals.

I THEREFORE MOVE that the Bureau of Sanitation work with the DWP and City General Services Division to identify a list of available and logical sites for Conversion Facilities within each of the six collection districts, including the possibility of co-locating facilities on DWP or other City property where infrastructure, space availability, environmental justice and zoning support doing so.

I FURTHER MOVE that the Bureau present the site list to the Environmental Quality and Waste Management Committee and the Commerce, Energy and Natural Resources Committee within 120 days.

I FUTHER MOVE that the Bureau identify cities that border the City of Los Angeles that may be willing to site a facility within their boundaries for joint use with the City of Los Angeles and present the list to the Environmental Quality and Waste Management Committee and the Commerce Energy and Natural Resources Committee within 120 days.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: Tony Cárdenas

JUL 0 5 2005

05-1407

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

JUN 2 8 2005

MOTION

Landfilling is a wasteful and environmentally dangerous practice that results in the waste of resources that could be reused, recycled or converted back to beneficial use.

Cities and countries around the world are making a commitment to eliminate the need for landfilling by drafting and adopting "Zero Waste" policies that attempt to return every resource that is currently disposed of in landfills back to beneficial use.

This is a multi-pronged effort that includes maximizing and expanding current recycling, reuse and resource recovery programs, as well as converting biomass into green, renewable energy, alternative fuels, chemicals, or other feedstocks for manufacturing.

To demonstrate a commitment to a zero waste plan, the City must be visionary. The first and most essential step, is to mandate an ongoing reduction in the tons per day disposed of in landfills.

I THEREFORE MOVE that the City Council mandate and Bureau of Sanitation implement a time-certain reduction in City Municipal Solid Waste (MSW) tonnage disposed at Sunshine Canyon Landfill accordingly:

YEAR	TONS PER DAY DISPOSED
2005	3,600 (CURRENT)
2006	3,000
2007	2,000
2008	1,000
2009	500

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: _____

AP

05-1364
CD 12

JUN 2 8 2005

BUDGET & FINANCE

JUN 22 2005

MOTION

The Bureau of Sanitation is in the process of a two-year multi-family recycling pilot that uses a multitude of approaches to evaluate best practices for rolling out Multi-Family recycling, citywide.

It is in the best interest of the City of Los Angeles to recycle as much as is possible, which includes doing what is necessary to recover recycleables from all condominiums and all apartment buildings with more than four units, for which the City does not currently provide recycling services.

A Multi-Family Recycling Program increases AB 939 diversion levels, reduces landfill disposal fees, increases recycling revenues and preserves virgin resources.

I THEREFORE MOVE that the Bureau of Sanitation expand Multi-Family Recycling to at least 50% of the City by the year 2010 and prepare a plan for inclusion of the remainder of the City by that time, including a time frame for full implementation and report back to the Budget and Finance Committee.

PRESENTED BY: _____
GREIG SMITH, Twelfth District

SECONDED BY: _____

05-1318
OLD CF 97-1912

JUN 22 2005

JUN 2 8 2005

MOTION

ENVIRONMENTAL QUALITY & WASTE MANAGEMENT

In September 2001, the City of San Jose, California adopted an Environmentally Preferable Procurement Policy. The primary purpose of this policy is to minimize negative environmental impacts of the City's activities by ensuring the procurement of services and products that reduce toxicity, conserve natural resources/materials/energy and maximize recyclability and recycled content of all purchased products. A collateral purpose of the procurement policy is to support markets for recycled goods and environmentally preferable products.

The City of Los Angeles also has an environmentally friendly procurement policy associated with its Recycled Products Purchasing Program. The Program promotes the City's purchase of goods, supplies and equipment containing recycled materials. The City has identified 19 products that are available and made from recycled materials. In addition, the City has designated 10 of these 19 items as "Buy Recycled 2000" products, which means that these products are proven items, commercially available, and that departments in need of those items should always buy such items made from recycled materials. These items include paper, office products, glass, lubricating oils, plastic products, rubber, batteries, compost, anti-freeze, fiberglass insulation, aggregate base, cement and concrete, promotional products, solvents, and paint. In July 2000, the City Council reaffirmed the City's commitment to buying and using recycled products, whenever feasible, including remanufactured laser toner cartridges as a "Buy Recycled 2000" product.

The City's program has benefitted the regional environment and has reduced the disposal of waste in landfills. Yet, it could be significantly improved by incorporating far reaching and holistic provisions similar to the City of San Jose Environmentally Preferable Procurement Policy. The San Jose Policy is not limited to 19 products and considers factors such as complete life cycle costs, packaging content and ultimate disposal of products.

I THEREFORE MOVE that the General Services Department, Environmental Affairs Department and the Bureau of Sanitation report to the Environmental Quality and Waste Management Committee in 45 days on the feasibility of improving the City's Recycled Products Purchasing Program and Ordinance by incorporating the following factors in the purchase of products:

- Minimization of virgin material use in product or service life cycle;
- Maximization of recycled products used in product or service life cycle;
- Environmental cost of entire product or service life cycle;
- Reuse of existing products or materials in product or service life cycle;
- Recyclability of product;
- Minimization or packaging;
- Reduction of energy/water consumption;
- Toxicity reduction or elimination;
- Elimination of uncertified hardwoods in product or service life cycle;
- Durability and maintenance requirements;
- Ultimate disposal of the product.

I FURTHER MOVE that the aforementioned Departments report on the feasibility of the City mandating departments to abide by these environmental preferable purchasing standards.

PRESENTED BY: _____
GREIG SMITH
Councilmember, 12th District

SECONDED BY: _____

JUN 2 8 2005

03-1365-S1

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APPENDIX A

REFERENCES

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APPENDIX B

GLOSSARY

GLOSSARY

1. **AB 939**: Assembly Bill 939 – The California Integrated Waste Management Act of 1989, mandates a reduction of waste being disposed: jurisdictions were required to meet diversion goals of 25% by 1995 and 50% by the year 2000. AB 939 also established an integrated framework for program implementation, solid waste planning, and solid waste facility and landfill compliance.

2. **Acid hydrolysis**: Enables widely available cellulosic materials, or more commonly, biomass, to be converted into sugar in an economically viable manner, thereby providing an inexpensive raw material for fermentation or chemical conversion into any of a hundred different specialty and/or commodity chemicals and fuels – the most common of which are ethanol and acetic acid.

3. **ADC**: Alternate Daily Cover for landfills; often comprised of ground greenwaste or inerts from C&D processing and used to replace soil to cover the MSW.

4. **Anaerobic Digestion**: A biological process occurring in the absence of oxygen that produces a gas principally composed of methane (CH4) and carbon dioxide (CO2) otherwise known as biogas. These gases are produced from organic wastes such as livestock manure, food processing waste, and the organic fraction of MSW.

5. **Autoclave**: A pressurized steam vessel typically used to process medical waste and render it non-infectious; now enlarged and re-engineered as a CT to process mixed MSW for recovery of recyclables, paper pulp and renewable energy.

6. **Balefills**: Landfills constructed of baled trash.

7. **Biocells (also Bioreactors)**: A special landfill design whereby water (often in the form of landfill leachate) is re-circulated through the MSW to create more optimal conditions for landfill gas generation and recovery for energy production. Also creates more usable space in the landfill by enhancing degradation, and reduces long-term maintenance costs by accelerating gas generation and recovery.

8. **Biofilters**: A bed of organic material, typically a mixture of compost and wood chips used to minimize odor from MSW and other facilities. As air passes through the biofilter the microbes on the organic material convert odorous gases to carbon dioxide and water. The effectiveness of the biofilter is primarily a function of the amount of time the odorous air spends in the biofilter (contact time) and the moisture content of the filter material.

9. **Biogas**: Biogas is generated when bacteria degrade biological material in the absence of oxygen, in a process known as anaerobic digestion. Since biogas is a mixture of methane (also known as marsh gas or natural gas, CH_4) and carbon dioxide it is a renewable fuel produced from waste.

10. **Biomass**: A renewable energy resource derived from the carbonaceous waste of various human and natural activities. It is derived from numerous sources, including the by-products from the timber industry, agricultural crops, raw material from the forest, portions of household waste and wood.

11. **Bio-refinery**: A CT facility producing ethanol and/or other chemicals; also called "Fermentation" by the CIWMB

12. **Black can**: Part of the three-can curbside collection system; this can is typically used for trash.

13. **Blue can**: Part of the three-can curbside collection system; this can is typically used for recyclables.

14. **California Integrated Waste Management Board (CIWMB):** Responsible for managing California's solid waste stream. The Board is helping California divert its waste from landfills by developing waste reduction programs, providing public education and outreach, assisting local governments and businesses, and fostering market development for recyclable materials. The Board also protects public health and the environment by encouraging used oil recycling, regulating waste management facilities, and cleaning up abandoned and illegal dump sites. The Board is one of six agencies under the umbrella of the California Environmental Protection Agency (Cal/EPA).

15. **Cellulosic ethanol**: Ethanol made from cellulose; typical feedstocks are crop wastes (i.e. corn stover or sugarcane bagasse), purposely grown fuel crops (i.e. switch grass), and the organic fraction of MSW.

16. **City rebate program**: one of a variety of programs funded by the Bureau of Sanitation to reward recycling activities in the private sector.

17. **Compaction truck**: A refuse collection vehicle using high-power mechanical or hydraulic equipment to reduce the volume of solid waste in the truck body, thus allowing a greater payload.

18. **Conditional Use Permit (C.U.P.)**: A discretionary permit given by Planning Departments that allows special uses which may be essential or desirable to a particular community, but which are not allowed as a matter of right within a zoning district, through a public hearing process. A conditional use permit can provide flexibility within a zoning ordinance. Another traditional purpose of the

conditional use permit is to enable a municipality to control certain uses which could have impacts on the community.

19. **Conversion technology (CT)**: An array of state-of-the-art technologies capable of converting residual solid waste (material remaining after recyclables have been extracted) into useful products including renewable and environmentally benign fuels, chemicals, and other sources of clean energy, such as electricity.

20. **Curbside collection**: Collection of greenwaste, recyclables, or trash at the edge of a sidewalk in front of a residence or shop.

21. **Curing stage**: Allowing partially composted materials to sit in a pile for a specified period of time as part of the maturing process in composting.

22. **Deconstruction**: The process of removing a building by taking it apart in the reverse order of construction. Deconstruction is an alternative to demolition and landfilling and combines the salvage and recovery of building materials for creative reuse and recycling.

23. **Digestors:** any of a variety of in-vessel systems in which organic wastes are broken down via biological activity generating gasses and a solid residual

24. **"Dirty" MRF**: A Material Recovery Facility processing mixed MSW as opposed to source-separated material.

25. **Distillation**: The process of first heating a mixture to separate the more volatile from the less volatile parts, and then cooling and condensing the resulting vapor so as to produce a more nearly pure or refined substance; for application in this report, a process used in bio-refineries following fermentation to produce ethanol.

26. **Environmental Impact Report (EIR):** An evaluation designed to identify and predict the impact of an action or a project on the environment and human health and well-being. Can include risk assessment as a component, along with economic and land use assessment. Often triggered by the need for a project to obtain a C.U.P.

27. **Enzymatic hydrolysis:** The process of converting cellulosic material to ethanol using micro-organisms, as opposed to chemicals or heat

28. **Ethanol:** a colorless, volatile, pungent liquid, C_2H_5OH, that can be burned as fuel; a clean, renewable fuel typically manufactured from corn or sugar cane, but also from the cellulosic portions of crop residues, forest trimmings, or MSW

29. **European Union (EU):** A family of democratic European countries, committed to working together for peace and prosperity. It is not a State intended to replace existing states, but it is more than any other international organization. The EU is,

in fact, unique. Its Member States have set up common institutions to which they delegate some of their sovereignty so that decisions on specific matters of joint interest can be made democratically at European level. This pooling of sovereignty is also called "European integration." EU members are: Austria, Belgium, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, The Netherlands, United Kingdom.

30. **Extended Producer Responsibility**: The extension of the responsibility of producers for the environmental impacts of their products to the entire product life cycle -- and especially for their take-back, recycling, and disposal.

31. **Fermentation**: One of the CT processes; the energy-yielding anaerobic metabolic breakdown of a nutrient molecule, such as glucose, without net oxidation – yielding ethanol or other products.

32. **Franchise fee**: Money paid by the owner of a franchise for the right to collect (and very often to dispose) of the solid waste or recyclables collected. May be an annual fee, usually based on tonnage.

33. **Franchise hauler**: Private company given the right (exclusive or non-exclusive) to service a segment of the waste system (i.e. residential single family homes, or commercial); and/or a particular geographic region

34. **Gasification**: One of the CT processes in which organic material is processed thermally (non-combustion mode) to break it down into synthetic gas, inert ash and water. The synthetic gas is typically used to generate steam and/or electricity.

35. **Gate fee**: Fee charged at the entrance to solid waste facilities, typically based on payload tonnage.

36. **Grasscycling**: The simple practice of leaving grass clippings on the lawn when mowing. Once cut, grass clippings first dehydrate, and then decompose, quickly disappearing from view. Grasscycling encourages a healthier lawn by returning nutrients to the soil beneath the lawn and benefits the environment by naturally recycling the clippings.

37. **Green building**: By integrating natural resource, human health, and community concerns into building design and construction, architects and designers can create buildings that are cleaner, healthier for occupants and the environment, and which deplete fewer resources. Moreover, a well-designed "green" building can be cheaper to build and operate over the building's lifetime.

38. **Green can**: Part of the three-can collection system; used for greenwaste.

39. **"Green collar" job**: Career based on servicing the environment.

40. **Green power**: Green power is a marketing term for electricity that is partially or entirely generated from environmentally preferable renewable energy sources, such as solar, wind, geothermal, biomass, biogas, and low-impact hydro. Green power is sold to support the development of new renewable energy sources. Products made with green power always contain a higher percentage of electricity from renewable energy sources than conventional electrical service.

41. **Greenwaste**: Garden waste, such as grass cuttings, hedge and tree trimmings, weeds and dead flowers.

42. **Gross receipts franchise fee:** A program instituted by the Los Angeles Bureau of Sanitation in which private haulers pay a fee each quarter based on a percentage of their total gross receipts.

43. **Incineration**: The process of burning solid waste under controlled conditions to reduce its weight and volume, and often to produce energy.

44. **Inert residue:** Residue from various processes that has been stabilized and is no longer reactive in the environment

45. **Intermodal yard**: A yard for transferring shipping containers on and off ships, trains, and trucks.

46. **In-vessel Composting**: A process in which compostable material is enclosed in a drum, silo, bin, tunnel, reactor, or other container for the purpose of producing compost maintained under uniform conditions of temperature and moisture where air-borne emissions are controlled.

47. **LANCER:** The acronym for the WTE project for the City of Los Angeles that was proposed in the mid-1980's but never constructed.

48. **Landfill Directive**: The EU Landfill Directive [1999/31/EC] was adopted in July of 1999. The Directive aims to improve standards of landfilling across Europe, through setting specific requirements for the design, operation and aftercare of landfills, and for the types of waste that can be accepted in landfills. The Directive aims to reduce the amount of their biodegradable municipal waste sent to landfill.

49. **Liquefied Natural Gas (LNG):** A natural gas cooled to roughly -260° F at normal air pressure. It is odorless, non-toxic, non-corrosive and less dense than water. Essentially, it is the same natural gas more than 60 million Americans use to heat and cool their homes, only in a liquid state.

50. **Los Angeles County Sanitation Districts (LACSD):** The Sanitation Districts are a confederation of independent special districts serving about 5.1 million people

in Los Angeles County. Its service area covers approximately 800 square miles and encompasses 78 cities and unincorporated territory within the County. The Districts construct, operate, and maintain facilities to collect, treat, recycle, and dispose of sewage and industrial wastes. The Districts also provide for the management of solid wastes, including disposal, transfer operations and materials recovery. Local sewers and laterals that connect to the Sanitation Districts' trunk sewer lines are the responsibility of the local jurisdictions, as is the collection of solid wastes.

51. **Material Recovery Facility (MRF):** A facility for separating recyclables by manual or mechanical means. Some MRFs are designed to separate recyclables from mixed MSW, others for sorting source-separated material. MRFs then bale and sell the recovered materials.

52. **Mom and apple pie qualities:** a euphemism meaning qualities that are good for humans or the environment, healthy, or clean (such as clean air, or recycling of resources)

53. **MSW composting**: One of the CT process that involves in-vessel composting of mixed MSW in temperature, air and moisture controlled conditions. Usually followed by a typical windrow or aerated static pile composting step. The finished compost can be sold, given away, or used by the company or municipality in local landscaping projects.

54. **Municipal Solid Waste (MSW):** All solid waste generated in an area except industrial and agricultural wastes. Sometimes includes construction and demolition debris and other special wastes that may enter the municipal waste stream. Generally excludes hazardous wastes. Sometimes defined to mean all solid wastes that a city authority accepts responsibility for managing in some way.

55. **Mulching lawnmower:** specially designed lawnmowers that chop up the grass and leave in on the lawn.

56. **Non-exclusive franchise system**: A system of MSW or recyclables collection in which private haulers are awarded franchise agreements to operate in a certain geographic region or for a certain wastestream, but must compete with each other.

57. **Optical glass sorting**: removes ceramic and metal contaminants from color-separated clear, brown, and green glass using laser light. The new sorting technology also has the ability to convert three-color mixed glass into clean, usable cullet.

58. **Polycyclic Aromatic Hydrocarbons (PAHs):** Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like

tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

59. **Private/public partnership**: A teaming of a public jurisdiction and one or more private companies typically for project development in which each side brings resources to the table in a cooperative effort.

60. **Putrescible Wastes:** Wastes that are capable of being decomposed by microorganisms with sufficient rapidity as to cause nuisances because of odors, vectors, gases or other offensive conditions, and include materials such as, but not limited to food wastes, offal and dead animals.

61. **Pyrolysis:** One of the CT processes involving chemical decomposition of a substance by heat in the absence of oxygen, resulting in various hydrocarbon gases and carbon-like residue. The gases are typically used to generate steam and or electricity.

62. **Recyclable:** The quality of a material that allows it to be recycled.

63. **Recycled content procurement policy**: A voluntary business practice which states that price, quality and availability being comparable, a company or government jurisdiction shall favor products made with recyclable materials.

64. **Recycled Market Development Zone (RMDZ):** The Recycling Market Development Zone program combines recycling with economic development to fuel new businesses, expand existing ones, create jobs, and divert waste from landfills. This program provides attractive loans, technical assistance and free product marketing to businesses that use materials from the waste stream to manufacture their products and are located in a zone. The zones cover roughly 71,790 square miles of California from the Oregon border to San Diego.

65. **Recycling rebate:** A monetary reward given to companies that deliver material to MRFs rather than directly to the landfill.

66. **Refuse-derived fuel (RDF):** Fuel produced from MSW that has undergone processing. Processing can include separation of recyclables and noncombustible materials, shredding, size reduction, and palletizing.

67. **Residual repositories:** Landfills accepting only inert residual material from MSW processing.

68. **Resource Recovery & Recycling Act of 1989:** See AB 939.

69. **ROGs:** Reactive Organic Gases, typically a pollutants from decomposition or processing of organic material

70. **RPS**: Renewable Portfolio Standard; a State mandate requiring utilities to purchase certain percentages of renewable energy; LADWP has committed to purchase 20% of their energy from renewable sources (wind, biomass, solar, etc.) by 2017.

71. **SCAG**: Southern California Association of Governments.

72. **Soil amendment:** Any material added to a soil to improve its physical properties, such as water retention, permeability, water infiltration, drainage, aeration and structure.

73. **Source-separation**: Setting aside of compostable and recyclable materials from the waste stream before they are collected with other MSW, to facilitate reuse, recycling, and composting.

74. **South Coast Air Quality Management District (SCAQMD):** The AQMD is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. This area of 10,000 square miles is home to nearly 16 million people - about half the population of the whole state of California.

75. **Southeast Resource Recovery Facility (SERRF):** Located in the City of Long Beach, this Waste-to-Energy (WTE) facility accepts only non-hazardous municipal solid waste and combusts it under controlled conditions to generate steam and electricity.

76. **Static Pile**: A composting process that is similar to the aerated static pile except that the air source may or may not be controlled.

77. **Sustainability**: Defined as meeting the needs of the present without compromising the ability of future generations to meet their needs. A sustainable organization seeks to participate within its community and seeks to balance economy, society and environment within its operations. Through seeking balance, an organization may better steward natural and economic resources taking into account the needs of future generations.

78. **Syngas:** Gases of varying composition that are generated in gasification, pyrolysis and some types of waste-to-energy facilities. The name comes from their use in creating synthetic petroleum for use as a fuel or lubricant via Fischer-Tropic synthesis. Syngas consists primarily of carbon monoxide and hydrogen, and has less than half the energy density of natural gas. It also contains some sulfur compounds, a safety feature since this allows for its detection in the case of leakage. These gases are combustible, and are often stored to be burned as a fuel source.

79. **Tiered system:** Refers to the CIWMB permitting system where facilities must obtain Solid Waste Facility Permits of different complexities and requirements based on the size and type of facility and its potential impacts.

80. **Tipping fee**: A fee for unloading or dumping waste at a landfill, transfer station, incinerator, or recycling facility; synonymous with Gate Fee.

81. **Transfer station**: A facility at which MSW from refuse collection vehicles is consolidated into loads that are transported by larger trucks or other means to more distant final disposal facilities, typically landfills.

82. **Transfer truck**: Typically an 18 wheel semi-truck and trailer used to haul payloads of up to 25 tons from transfer stations to landfills. Also used to transport greenwaste and recyclables to and from processing facilities.

83. **Variable can rate**: A refuse collection rate system in which residents pay according to the size of their trash container, with smaller containers paying lower rates. The system is used to create an incentive for residents to reduce MSW and increase recycling, also called a "pay as you throw" system.

84. **Vermicomposting**: A type of composting in which worms (typically red wrigglers) ingest and digest organic waste material and generate "castings" that are a very good source of organic fertilizer that is high in nutrients and yet will not burn plant roots in any concentration.

85. **Volatile Organic Compounds (VOCs):** Volatile organic compounds are compounds that have a high vapor pressure and low water solubility. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants. VOCs typically are industrial solvents, such as trichloroethylene; fuel oxygenates, such as methyl tert-butyl ether (MTBE); or by-products produced by chlorination in water treatment, such as chloroform. VOCs are often components of petroleum fuels, hydraulic fluids, paint thinners, and dry cleaning agents. VOCs are common ground-water contaminants.

86. **Waste-to-Energy (WTE):** A facility that uses MSW as a feedstock (processed into RDF or as is) and combusts it under controlled conditions to produce energy. WTE plants can produce steam for district heating or industrial use, or generate electricity.

87. **White goods**: Appliances such as stoves, dishwashers, refrigerators, and clothes washers and dryers.

88. **Windrow Composting Process**: The traditional composting process in which compostable material is placed in elongated piles. The piles or "windrows" are aerated and/or mechanically turned on a periodic basis.

APPENDIX C

SOLID WASTE FACILITIES IN THE REGION

SOLID WASTE FACILITIES IN THE REGION

Type of Facility	Number	Name of Facility	Address	Permitted Throughput
Waste-to-Energy				
	1	Commerce Refuse-To-Energy Facility	5926 Sheila Street, Commerce, CA 90040	1,000 TPD
	2	Southeast Resource Recovery Facility	4000 Seaside Boulevard, Long Beach, CA 90822	2,240 TPD
			Total Permitted Capacity	**3,240 TPD**
Greenwaste				
	3	**Anchorage Composting Facility**	**Seaside Avenue at Navy Way, San Pedro, CA**	**50 TPD**
	4	B.P. John Recycling Inc.	28700 Matthews Road, Romoland, CA 92585	450 TPD
	5	Brea Green Recycling	1983 Valencia Avenue, Brea, CA 92812	500 TPD
	6	California Wood Recycling, Inc.	3540-A Ventura Road, Ventura, CA 93003	500 TPD
	7	**Community Recycling Green, Food and Woodwaste Facility**	**11300 Pendleton Street, Sun Valley, CA 91352**	**3,000 TPD**
	8	**Griffith Park Composting Facility**	**5400 Griffith Park Drive, Los Angeles, CA 90027**	**1,000 Cu Yards/day**
	9	**Harbor Mulching Facility**	**1400 Gaffey Street, San Pedro, CA 90731**	**80 TPD**
	10	IEUA Composting Facility	8100 Chino-Corona Road, Chino, CA 91720	1,700 TPD
	11	La Pata Greenwaste Facility	31748 La Pata Road, San Juan Capistrano, CA 92673	500 TPD
	12	**Lake View Terrace Green Recycling Facility**	**11950 Lopez Canyon Road, Los Angeles, CA 91342**	**300 TPD**
	13	One Stop Landscape Supply Center	13024 San Timoteo Canyon Road, Redlands, CA 92373	500 TPD
	14	R & S Soil Products, Inc.	20200 Bake Parkway, Lake Forest, CA 92530	300 Cu Yards/day
	15	Shoreline Organics Soil Amend and Composting	6859 Arnold Road, Port Hueneme, CA 93041	400 Cu Yards/day
	16	Synagro Regional Composting Facility	22500 Temescal Canyon Road, Corona, CA 91719	500 TPD
	17	Tierra Verde Industries	7982 Irvine Boulevard, Irvine, CA 92618	1,500 TPD
	18	TVI Gold Coast Recycling and Composting	7973 Irvine Boulevard, Irvine, CA 92618	1,500 TPD
	19	**Van Norman Chipping and Grinding**	**15751 Rinaldi Street, Granada Hills, CA 91344**	**499 TPD**
	20	Whittier Fertilizer	9441 Kruse Road, Pico Rivera, CA 90660	200 Cu Yards/day
	82	Lancaster Composting Facility	600 East Avenue F, Lancaster, CA 93535	1,000 Cu Yards/day
			Total Permitted Capacity	**12,304 TPD**
Landfills				
	21	Badlands Landfill	31125 Ironwood Avenue, Moreno Valley, CA 92303	4,000 TPD
	22	**Bradley Landfill West and West Extension**	**9227 Tujunga Avenue, Sun Valley, CA 91352**	**10,000 TPD**
	23	Burbank Landfill Site No. 3	1600 Lockheed View Drive, Burbank, CA 91504	240 TPD
	24	Calabasas Sanitary Landfill	5300 Lost Hills Road, Agoura, CA 91301	3,500 TPD
	25	California Street Landfill	1950 Nevada Street, Redlands, CA 92373	829 TPD
	26	Chiquita Canyon Sanitary Landfill	29201 Henry Mayo Drive, Valencia, CA 91384	6,560 TPD
	27	Colton Sanitary Landfill	850 Tropica Rancho Road, Colton, CA 92324	3,100 TPD
	28	El Sobrante Landfill	10910 Dawson Canyon Road, Corona, CA 91719	10,000 TPD
	29	Frank R. Bowerman Sanitary Landfill	11002 Bee Canyon Access Road, Irvine, CA 92618	8,500 TPD
	30	Lamb Canyon Sanitary Landfill	16411 State Highway 79, Beaumont, CA 92223	3,000 TPD
	31	Mid-Valley Sanitary Landfill	2390 North Alder Avenue, Rialto, CA 92377	7,500 TPD
	32	Olinda Alpha Sanitary Landfill	1942 North Valencia Avenue, Brea, CA 92823	8,000 TPD
	33	Prima Deshecha Sanitary Landfill	32250 La Pata Avenue, San Juan Capistrano, CA 92675	4,000 TPD
	34	Puente Hills Landfill #6	2800 South Workman Mill Road, Whittier, CA 90601	13,200 TPD
	35	San Timoteo Sanitary Landfill	San Timoteo Canyon Road, Redlands, CA 92373	1,000 TPD
	36	Savage Canyon Landfill	13919 East Penn Street, Whittier, CA 90602	350 TPD
	37	Scholl Canyon Sanitary Landfill	3001 Scholl Canyon Road, Glendale, CA 91206	3,400 TPD
	38	Simi Valley Landfill and Recycling Center	2801 Madera Road, Simi Valley, CA 93065	3,000 TPD
	39	**Sunshine Canyon City Landfill**	**14747 San Fernando Road, Sylmar, CA 91344**	**12,100 TPD**
	40	Toland Road Landfill	3500 North Toland Road, Santa Paula, CA 93060	1,500 TPD
	80	Antelope Valley Public Landfill	1200 West City Ranch Raod, Palmdale, CA 93551	3,200 TPD
	81	Lancatser Lanfdill & Recycling Center	600 East Avenue F, Lancaster, CA 93535	1,700 TPD
			Total Permitted Capacity	**108,679 TPD**

SOLID WASTE FACILITIES IN THE REGION

Type of Facility	Number	Name of Facility	Address	Permitted Throughput
MRF/Transfer Stations				
	41	**American Waste Industries**	**11121 Pendleton Avenue, Sun Valley, CA 91352**	**2,000 TPD**
	42	American Waste Transfer Station	1449 West Rosecrans Avenue, Gardena, CA 90247	2,225 TPD
	43	**Angelus Western Paper Fibers, Inc.**	**2474 Porter Street, Los Angeles, CA 90021**	**650 TPD**
	44	Athens Services	14048 East Valley Boulevard, Industry, CA 91746	1,920 TPD
	45	Bel-Art Waste Transfer Station	2501 East 68th Street, Long Beach, CA 90805	1,500 TPD
	46	Browning Ferris Industries Recycling and Transfer Station	2509 West Rosecrans Avenue, Compton, CA 90220	1,500 TPD
	47	Carson Transfer Station and Materials Recovery Facility	321 West Francisco Street, Carson, CA 90745	5,300 TPD
	48	**Central Los Angeles Recycling Center and Transfer Station**	**2201 Washington Boulevard, Los Angeles, CA 90034**	**4,025 TPD**
	49	City of Newport Beach Transfer Station	592 Superior Avenue, Newport Beach, CA 92663	300 TPD
	50	City of Santa Monica Transfer Station	2500 Michigan Avenue, Santa Monica, CA 90404	400 TPD
	51	City Terrace Recycling Transfer Station	1511-1525 Fishburn Avenue, City Terrace, CA 90063	200 TPD
	52	Coastal Material Recovery Facility and Transfer Station	357 West Compton Boulevard, Gardena, CA 90248	500 TPD
	53	**Community Recycling/ Resource Recovery, Inc.**	**9147 De Garmo Avenue, Sun Valley, CA 91352**	**4,500 TPD**
	54	Consolidated Volume Transporters	1131 North Blue Gum Street, Anaheim, CA 92806	6,000 TPD
	55	Culver City Transfer/Recycling Station	9255 West Jefferson Boulevard, Culver City, CA 90232	500 TPD
	56	Del Norte Regional Recycling and Transfer	111 South Del Norte Boulevard, Oxnard, CA 93030	2,779 TPD
	57	Downey Area Recycling and Transfer	9770 Washburn Road, Downey, CA 90241	5,000 TPD
	58	East Los Angeles Recycling and Transfer Station	1512 North Bonnie Beach Place, City Terrace, CA 90063	700 TPD
	59	**Falcon Refuse Center, Inc.**	**3031 East I Street, Wilmington, CA 90744**	**1,850 TPD**
	60	Gold Coast Recycling Facility	5275 Colt Street, Ventura, CA 93003	440 TPD
	61	Grand Central Recycling and Transfer Station	999 Hatcher Avenue, Industry, CA 91748	1,500 TPD
	62	Heaps Peak Transfer Station	N Side Hwy 18; 3 mi West of Running Springs, Lake Arrowhead, CA 92407	300 TPD
	63	Inland Regional Materials Recovery Facility and Transfer Station	2059 East Steel Road, Colton, CA 92324	1,950 TPD
	64	Innovative Waste Control	4133 Bandini Boulevard, Vernon, CA 90023	1,250 TPD
	65	**Mission Road Recycling and Transfer Station**	**840 South Mission Road, Los Angeles, CA 90023**	**1,785 TPD**
	66	Moreno Valley Solid Waste Recycling & Transfer Facility	17700 Indian Street, Moreno Valley, CA 92551	2,000 TPD
	67	Paramount Resource Recycling Facility	7230 Petterson Lane, Paramount, CA 90723	2,400 TPD
	68	Perris Transfer Station and Materials Recovery Facility	1706 Goetz Road, Perris, CA 92570	1,800 TPD
	69	Puente Hills Materials Recovery Facility	2800 South Workman Mill Road, Whittier, CA 90601	4,400 TPD
	70	Rail Cycle Commerce Materials Recovery Facility	6300 East 26th Street, Commerce, CA 99999	4,200 TPD
	71	Rainbow Recycling/Transfer Station	17121 Nichols Avenue, Huntington Beach, CA92647	2,800 TPD
	72	Robert A Nelson Transfer Station and Materials Recovery Facility	1830 Agua Mansa Road, Rubidoux, CA 92509	2,700 TPD
	73	South Gate Transfer Station	9530 South Garfield Avenue, South Gate, CA 90280	1,000 TPD
	74	Southern California Disposal Co. Recycling and Transfer Station	1908 Frank Street, Santa Monica, CA 90404	1,056 TPD
	75	Stanton Transfer and Recycling Center #8	11232 Knott Avenue, Stanton, CA 90686	1,800 TPD
	76	Sunset Environmental, Inc. Transfer Station/Resource Recovery Facility	16122 Construction Circle West, Irvine, CA 92606	2,050 TPD
	77	Waste Management of Orange	2050 Glassell Street, Orange, CA 92865	1,500 TPD
	78	Waste Management South Gate Transfer	4489 Ardine Street, South Gate, CA 90280	2,000 TPD
	79	West Valley Materials Recovery Facility	13373 Napa Street, Fontana, CA 92335	5,000 TPD
	83	**Bradley Landfill West and West Extension**	**9227 Tujunga Avenue, Sun Valley, CA 91352**	**>200 TPD**
			Total Permitted Capacity	**83,980 TPD**

Note: Facilties in red font are located in the City of Los Angeles

APPENDIX D

MAJOR CT COMPANIES AND FACILITIES

Company	Technology	Facility Location (*Under construction)	TPD/TPY	Feedstock a
Arrow Ecology	Anaerobic Digestion	Tel Aviv, Israel	75,000 TPY	MSW
BAV Umwelttechnik	Anaerobic Digestion	Anlage Haus Forst, Germany	-	O
		Antalya, Turkey	-	O
		Camden County, NJ	-	O
		Hamilton, OH	-	O
		Hickory, NC	-	O
		Lambsheim, Germany	-	O
		Newberg, OR	-	O
		Serra de Conti, Italy	-	O
		Sturovo, Slovakia	-	O
Biotechnische Abfallverwertung GmbH & Co KG (BTA)	Anaerobic Digestion	Alghoba, Libya*	11,000 TPY	MSW
		Baden-Baden, Germany	5,000 TPY	G
		Biogaspark, Austria*	-	-
		Dietrichsdorf, Germany	17,000 TPY	G, MSW
		Donau-Ries, Germany	11,000 TPY	G
		Elsinore, Denmark	20,000 TPY	G
		Ieper, Belgium	50,000 TPY	G
		Karlsruhe, Germany	8,000 TPY	G
		Kaufbeuren, Germany	2,500 TPY	G
		Ko-Sung, Korea	3,000 TPY	G
		Krosno, Poland*	30,000 TPY	G, MSW
		Kushima City, Japan	1,000 TPY	MSW
		Mulheim, Germany	22,000 TPY	G, MSW
		Munich, Germany	20,000 TPY	G
		Munster, Germany	20,000 TPY	G
		Nara City, Japan	1,500 TPY	F
		Pamplona, Spain*	100,000 TPY	MSW
		Parramatta/Sydney, Australia	35,000 TPY	MSW
		Pulawy, Poland	20,000 TPY	MSW
		Schwabach, Germany	12,000 TPY	G
		Toronto, Canada	15,000 TPY	MSW
		Unteraligau, Germany	11,500 TPY	G
		Verona, Italy	70,000 TPY	MSW
		Villacidro, Italy	45,000 TPY	MSW
		Wadern-Lockweiler, Saarland, Germany	20,000 TPY	G, MSW
		Wels, Austria	15,000 TPY	G
		Ypres, Belgium	50,000 TPY	G
Canada Composting Inc.	Anaerobic Digestion	Toronto, Canada	25,000 TPY	O
Citec	Anaerobic Digestion	Ashigara, Tokyo, Japan	500 TPY	G
		Friesland, Netherlands	90,000 TPY	MSW
		Groningen, Netherlands	85,000 TPY	MSW
		Ikoma, Japan	3,000 TPY	G
		Jonkoping, Sweden	15,000 TPY	G
		Jouetsu, Japan	12,000 TPY	G
		Kil, Sweden	3,000 TPY	G
		Pinerolo, Italy	30,000 TPY	MSW
		Shimonia, Japan	5,000 TPY	G
		Vaasa, Finland	30,000 TPY	MSW
Farmatic Biotech Energy AG	Anaerobic Digestion	Alteno, Germany	-	O
		Amman, Jordan	-	O
		Neubukow, Germany	-	O
Halton Recycling, Ltd.	Anaerobic Digestion	Newmarket, Canada	120,000 TPY	O
HerHof Environmental	Anaerobic Digestion	Asslar, Germany	140,000 TPY	MSW
		Berlin, Germany*	135,000 TPY	MSW
		Dresden Region, Germany*	120,000 TPY	MSW
		Dresden City, Germany	85,000 TPY	MSW
		Geel, Belgium	150,000 TPY	MSW
		Nordhessen, Germany*	180,000 TPY	MSW
		Osnabruck, Germany	85,000 TPY	MSW
HerHof Environmental	Anaerobic Digestion	Rennerod, Germany	100,000 TPY	MSW
		Trier, Germany	180,000 TPY	MSW
		Venice, Italy	125,000 TPY	MSW
Organic Waste Systems (OWS)	Anaerobic Digestion	Aarberg, Switzerland	11,000 TPY	MSW
Organic Waste Systems (OWS)	Anaerobic Digestion	Bassum, Germany	13,500 TPY	MSW

Company	Technology	Facility Location (*Under construction)	TPD/TPY	Feedstock a
	Dranco	Brecht I, Belgium	20,000 TPY	MSW
		Brecht II, Belgium	50,000 TPY	MSW
		Hille, Germany*	38,000 TPY	MSW
		Kaiserslautern, Germany	20,000 TPY	MSW
		Leonberg, Germany	30,000 TPY	MSW
		Münster, Germany*	24,000 TPY	MSW
		Pusan, South Korea*	75,000 TPY	MSW
		Rome, Italy	40,000 TPY	MSW
		Salzburg, Austria	20,000 TPY	MSW
		Terrassa, Spain*	25,000 TPY	MSW
		Villeneuve, Switzerland	10,000 TPY	MSW
Orgaworld	Anaerobic Digestion	Elsendorp, Netherlands	25,000 TPY	O
		Lelystad, Netherlands	85,000 TPY	O
Schwarting Umwelt GmbH	Anaerobic Digestion	Backensholz, Germany*	-	O
		Baden-Württemberg, Germany*	-	G
		Bentheim, Germany	-	G
		Borken, Germany	-	G
		Brandenburg, Germany	-	G
		Brandenburg, Germany	-	O
		Dithmarschen, Germany	-	G
		Düren, Germany	-	O
		Gut Müttinghoven, Germany	-	G
		Halle, Germany	-	G
		Leer, Germany	-	O
		Linkenbach, Neuwied, Germany	-	O
		Lüneburg, Germany	-	G
		Münster, Germany	-	G
		Pinneberg, Germany	-	G
		Schleswig-Holstein, Germany	-	O
		Tirpersdorf, Germany*	-	O
		Torfwerk Schwegermoor, Germany	-	G
		Valqueimado, Portugal	-	O
Valorga	Anaerobic Digestion	Amiens, France	85,000 TPY	MSW
		Barcelone - Ecoparque II, Spain*	120,000 TPY	O, MSW
		Bassano, Italy*	44,200 TPY	MSW
			8,200 TPY	G
		Cadiz, Spain*	115,000 TPY	O, MSW
		Engelskirchen, Germany	35,000 TPY	G
		Freiburg, Germany	36,000 TPY	G
		Geneva, Switzerland	10,000 TPY	G
		La Coruna, Spain	182,500 TPY	MSW
		Mons, Belgium	58,700 TPY	MSW
			35,700 TPY	G
		Tilburg, Netherlands	52,000 TPY	O
		Varennes-Jarcy, France	100,000 TPY	MSW
			30,000 TPY	G
Comprehensive Resource Recovery and Resuse (CR3)	Autoclave	Minneapolis, MN	87,500 TPY	MSW
World Waste International (WWI)	Autoclave	Anaheim, CA	105,000 TPY	MSW
Ag-bag International, Ltd.	Composting	Wisconsin municipality	-	G
		Wyoming air force base	-	G
		California landfill	-	G, O
		California zoo	-	G, O
		West Virginia composter	-	G, O
		Florida air force base	-	G, O, W
		Maryland dairy	-	G, O, W
		Ohio custom composter	-	G, O
		New York municipality	-	G, O, W
		Massachusetts composter	-	F, W
		California University	-	G, O
		California army base	-	G, O
		Washington composter	-	G
		California hauler/composter	-	G
		New York composter	-	F, W
Ag-bag International, Ltd.	Composting	California air force base	-	O, W

Company	Technology	Facility Location (*Under construction)	TPD/TPY	Feedstock a
		Oregon municipality	-	O, W
		Wisconsin Dairy	-	G, O
		French composter	-	F, O, W
		Korean composter	-	MSW, W
		Canary Islands Ag Inst.	-	F, G
		Japanese farmer	-	O, G
		Italian distributor	-	F, G, W
		Swedish distributor	-	O
		Canadian municipality	-	O
		Spain composter	-	O
		Swedish waste company	-	O
		Swedish municipality	-	F, MSW, W
IPS Composting Systems	Composting	Baldwinsville, NY	-	O
		Bennington, VT	-	O
		Bristol, RI	-	O
		Brusnwick, GA	-	O
		Burlington County, NJ	-	O
		Calabasas, CA	-	O
		Charleston, WV	-	O
		Delaware County, NY	-	O, MSW
		East Hampton, NY	-	O
		Fairfield, CT	-	O
		Farmington, CT	-	O
		Guilderland, NY	-	O
		Halifax, Nova Scotia	-	O
		Kingston, Ontario	-	O
		Krauchthal, Switzerland	-	O
		Leroy, NY	-	O
		Lockport, NY	-	O
		Merrimack, NH	-	O
		Mont de Marson, France	-	O
		North Royalton, OH	-	O
		Plymouth, NH	-	O
		Rapid City, SD	-	O, MSW
		Rikers Island, NY	-	O
IPS Composting Systems	Composting	Rockland County, NY	-	O
		S. Dartmouth, MA	-	O
		Shelby, NC	-	O
		State College, PA	-	O
		UAJA, PA	-	O
		Wellington, New Zealand	-	O
		West Palm Beach, FL	-	O
Orgaworld	Composting	Beek en Donk, Netherlands	35,000 TPY	O
		Drachten, Netherlands	44,000 TPY	O
		Zeeasterweg, Lelystad, Netherlands	75,000 TPY	O
Brightstar Environmental	Gasification	Wollongong, New South Wales, Australia	30,000 TPY	MSW
Compact Power	Gasification	Avonmouth, Bristol, UK	-	MSW
Genahol, Inc.	Gasification	Grove City, OH	-	-
Kompogas	Gasification	Alzey-Worms, Germany	26,000 TPY	O
		Bachenbülach, Switzerland	4,000 TPY	O
			10,000 TPY	O
		Braunschweig, Germany	26,000 TPY	O
		Frankfurt, Germany	30,000 TPY	O
		Hunsrück, Germany	10,000 TPY	O
		Jona, Switzerland*	5,000 TPY	O
		Kempten, Germany	10,000 TPY	O
		Kyoto, Japan	1,000 TPY	O
		Kyoto II, Japan	20,000 TPY	O
		Lenzburg, Switzerland*	5,000 TPY	O
		Lustenau, Austria	10,000 TPY	O
		München-Erding, Germany	26,000 TPY	O
		Niederuzwil, Switzerland	15,000 TPY	O
Kompogas	Gasification	Oetwil am See, Switzerland	10,000 TPY	O
		Otelfingen, Switzerland	12,500 TPY	O

Company	Technology	Facility Location (*Under construction)	TPD/TPY	Feedstock a
		Passau, Germany	39,000 TPY	O
		Rioja, Spain	75,000 TPY	O
		Roppen, Austria	10,000 TPY	O
		Rümlang, Switzerland	8,500 TPY	O
		Samstagern, Switzerland	10,000 TPY	O
		Volketswil, Switzerland	5,000 TPY	O
		Weiningen, Switzerland*	12,500 TPY	O
		Weissenfels, Germany	120,000 TPY	O
Primenergy LLC	Gasification	Bukit Kenak, Malaysia	-	G, W
		Greenville, MS	330 TPD	G
		Griffith, Australia	92 TPD	G, W
		Jonesboro, AR	165 TPD	G
		Megat Dewa, Malaysia	30 TPD	G, W
		Pasir Puteh, Malaysia	30 TPD	G, W
		Rossano, Italy	125 TPD	G
		San Jose, Costa Rica	30 TPD	G, W
		Sekinchan, Malaysia	30 TPD	G, W
		Simpang Empat, Malaysia	30 TPD	G, W
		Simpang Lima, Malaysia	30 TPD	G, W
		Stuttgart, AR	600 TPD	G
		Tulsa, OK	30 TPD	G, W
Thermoselect	Gasification	Chiba, Japan	100,000 TPY	MSW
		Fondotoce, Italy	30,000 TPY	MSW
		Karlsruhe, Germany	225,000 TPY	MSW
		Mutsu, Japan	140 TPD	MSW
Bedminster	MSW Composting	Cairns, Australia	-	MSW
		Cobb County, GA	-	MSW
		Edmonton, Canada	-	MSW
		Marlboro, MA	-	MSW
		Nantucket, MA	-	MSW
		Perth, Australia	-	MSW
		Pinetop, AR	-	MSW
		Port Stephens, Australia	-	MSW
		Saitama, Japan	-	MSW
		Sevierville, TN	-	MSW
		Sumter County, FL	-	MSW
		Vital Earth Resources, TX	-	MSW
Changing World Technologies	Other	Carthage, MO	200 TPD	O, G
WasteGen UK	Other	Burgau, Germany	36,000 TPY	MSW

a MSW - Municipal Solid Waste
G - Greenwaste
F - Foodwaste
O - Organics
W - Wood Chips

OMPANIES WITHOUT COMMERCIAL FACILITI	
Company	**Technology**
BioConverter Park	Anaerobic digestion
EcoCorp	Anaerobic digestion
Onsite Power Systems, Inc.	Anaerobic digestion
Arkenol	Fermentation
BC International Corporation	Fermentation
Brightstar	Gasification
EPI	Gasification
Recovered Energy, Inc.	Gasification
Scientific Utilization	Gasification
Startech Environmental Corporatior	Gasification
Thermogenics	Gasification
US Plasma, Inc.	Gasification
BRI Energy	Gasification/Fermentation
Omni Fuel	Gasification/pyrolysis
ECS	MSW Composting
HotRot Composting	MSW Composting
International Environmental Solutio	Pyrolysis
JF Bioenergy Inc.	Pyrolysis

APPENDIX E

SAMPLE PROGRAMS
IN
OTHER JURISDICTIONS

		Declared Zero Waste	Sample Programs	Sample Policies/Regulations/Ordinances
Country	Argentina			Legislation proposed in September 2003 to require manufacturers and importers to take back end-of-life batteries
	Austria		Waste Management Strategy for Austria	Landfill Ordinance set in place the restriction that no material may be landfilled if it has an organic carbon content higher than 5% /m/m)
	Bangladesh			In 2002, Bangladesh slapped an outright ban on all polyethylene bags in the capital, Dhaka.
	Belgium		Biowaste and Vegetation Waste Execution Plan of the Flemish Region of Belgium: separate collection of garden waste	Companies required to take back packaging
	Brazil		National battery, tire, plastic-packaging, and pesticide-packaging take-back programs. Developing a National Solid Waste Policy	
	Denmark			Tax on plastic bags paid for by the retailer
	England		Sustainable Waste Management Program; Delivery Team & Steering Group formed to implement new Programs of work; Local authority funding for the Waste Minimization and Recycling Fund or the Performance Reward Fund; Technology & Innovation Fund; Demonstrator Program; help establish viable waste treatment tech; Waste Tech Support; Waste Tech Data Centre: website resource	Landfill Tax/ Landfill Tax Credit Scheme
	European Union			Landfill Directive requires a substantial reduction in the amount of biodegradable MW being landfilled; requires a plan for the reduction of all biodegradable wastes in the landfill; bans the landfilling of corrosive, oxidizing, highly flammable, flammable or explosive waste, liquid hazardous waste, infectious hospital and other clinical wastes, whole used tires, shredded tires; Directive on Waste Incineration; Packaging and packaging Waste Directive
	Finland			Companies required to take back packaging
	France			Companies required to take back packaging
	Germany			Producer Responsibility Obligation (Packaging and Waste Regulation/ Green Dot Program); Waste Emissions Trading Bill; Landfill Tax
	Holland			1999 law which requires computers, appliances and other equipment to be taken back by their manufacturers
	Hong Kong		Implemented a campaign of "No plastic bags, please", and prohibits retailers over a specified size from providing free bags; there is also an environmental tax in place for products for which there is an environmentally-friendly alternative readily available	
	Hungary			Green Dot program in effect.
	India			A recently introduced law prohibits plastic bags thinner than 20 microns in the cities of Bombay and Delhi, along with the entire states of Maharashtra and Kerala
	Ireland			Plas Tax: individuals pay a tax of $.15 per plastic bag consumed at check out
	Italy		Refrigerator take back program in effect since 1997	
	Japan			Green Dot program in effect.; recycling law passed in October 2003 instructs computer manufacturers to place a recycling loop symbol on almost 98% of Japan's PCs. Consumers can take labeled PCs to their local post office to be recycled free of charge
	Korea	●		Green Dot program in effect.; 1995 Volume-based Waste Collection fee; imposed recycling duties on manufacturers of glass, cans, PETs, various plastics, TVS, refrigerators, washing machines, air conditioners, computers, cell phones, audio devices, tires, lubricant oil, light bulbs and batteries since 2003
	Mexico			National Omnibus Waste Law: establishes complex new legal regime for the classification, collection, transport, recycling and disposal of end-of-life products, including certain technological wastes.
	Netherlands			Landfill Ban of 1995: prohibits the landfilling of waste that can be recycled, reused or incinerated with energy recovery. The ban includes household waste, paper and paperboard, organic household waste and packaging. High tax on reusable or combustible waste. Packaging Directive

		Declared Zero Waste	Sample Programs	Sample Policies/Regulations/Ordinances
	New Zealand	●	Curbside recycling collection; re-use shops; financial incentives to separate waste; establishment of Resource Recovery Centers; Used Oil Recovery Program; Green Purchasing; standard recycling symbols for use on all recycling signage-drop-off points, recycling bins, collection vehicles; Bottle bills: funding the recycling of food and beverage containers	National Policy of Zero Waste: 95% of organic waste diverted by 2010; 50% of C&D waste diverted; landfill charges based on full cost recovery alongside regular landfill fees
	Northern Ireland		Recycling credit scheme designed to encourage recycling through payments made to those undertaking the activity (local authorities and private/voluntary organizations)/ Development of energy from Waste facilities. Waste Management Strategy for Northern Ireland	Waste and Contaminated Land Order of 1997; landfill levy
	Norway			Norwegian Pollution Control Authority has proposed to ban the landfilling of all biodegradable materials by mid-2009 to reduce the country's greenhouse gas emissions
	Nova Scotia, Canada		Divert organics from the landfill by having pickup for compostable materials; bans dry recyclables from landfills; return deposit program on beverage containers; 50% diversion from landfills	
	Ottawa-Carelton Region, Canada		Take it Back! program, now in its fourth year, is a unique, award-winning initiative that encourages residents to return waste products to local participating retailers. In 2000-2001, the Take it Back! program includes more than 60 household products and hazardous materials such as automotive and electronics products, medication and used needles that should not be deposited in garbage or recycling boxes.	
	Poland			Green Dot program in effect.
	Scotland		By 2010, 85% of Scottish households and other premises served by local authority collections will be offered a segregated curbside collection of recyclable materials/ Households and other premises will be offered a separate collection of organic waste/ Anaerobic digestion and CR3(?). National Waste Plan (2002-2020): 11 Area Waste plans that serve to reduce the amount of waste landfilled and increase composting, recycling, and conversion to energy programs	Waste Minimization Act of 1998: provides local authorities w/ powers to take steps to minimize waste; Waste and Emissions Trading Bill; landfill tax increases the cost of landfill disposal and provides incentives for actions to reduce the amount of waste disposed of in this way; producers are held responsible for the recycling or recovery of packaging materials
	Sweden			Companies required to take back packaging
	Taiwan			Green Dot program in effect; law banning the free distribution of plastic bags and disposable tableware in some 75,000 establishments, including restaurants, department stores, supermarkets, convenience stores, and fast-food franchises
	Wales		Waste Management Strategy for Wales; New Opportunities Fund: will provide £3.25 million for community sector re-use and recycling projects; UK Waste and Resources Action Program (WRAP) and to the "Creating Wales Markets for Recyclate" (CWMR) project being led by The Wales Environment Trust; Sustainable Technologies Initiative; Life Cycle Assessment: helps businesses to identify opportunities to minimize waste at all stages in a product's life (e.g. procurement, production, use and end of-life disposal).	Landfill Tax Credit Scheme; Landfill Levy
State	California		Zero Waste goal set by the California Integrated Waste Management Board in 2001. The plan mandates that Californian cities and counties must divert 50% from its landfills.	
	Massachusetts			Ban on the landfilling of TV and computer cathode ray tubes
County	Alameda		Rebates Program as an incentive for contractors to deliver their mixed C&D debris to "qualifying" mixed C&D recycling facilities; goal of 75% diversion from landfill.	In 1999, the county passed a Model Construction and Demolition Ordinance requiring contractors to divert at least 50% of their construction waste materials from the landfill. Building and demolition permit applicants are required to fill out a standard Waste Management Plan, outlining the estimated amounts and types of waste to be generated, reused, recycled and disposed. Applicants may also be required to submit proof that the materials gave been reused or recycled
	Bath and North East Somerset Council, England	●	Curbside collection of recyclables; free collection of fridges and freezers; provision of home composting bins; fortnightly collection of yard waste and cardboard for composting	
	Calaveras			Building contractors are prohibited from commercial use of the County solid waste transfer stations; generated wastes must be hauled by the contractor performing the work or a permitted hauler to the Rock Creek Solid Waste Facility or other designated material processing facility; illegal for recyclable material to be buried in a landfill or otherwise disposed of at other than locations where the material can be manufactured or reused

		Declared Zero Waste	Sample Programs	Sample Policies/Regulations/Ordinances
	Contra Costa			New ordinance effective July 8, 2004, which requires that at least 50% of jobsite debris generated by projects of 5,000 sq. ft. or greater be recycled, reused or otherwise diverted from landfill disposal. Failure to comply will result in the delay of the building/demolition permit(s), hold on the final inspection and/or monetary fine.
	Del Norte	●	Buy back centers; used building materials resale store; collection for trash, recyclables and organics; resource recovery park	
	El Dorado			All permit tees for projects are required to submit a debris recycling acknowledgment to the Director for review and approval at the time of submitting an application for permit. Within 60 days after the final and/or occupancy approval of the projects by the building official, the permittee shall submit a debris recycling report to the director for the director's approval. The report will be approved only if 50% diversion has been met thru reduction, reuse, and recycling.
	Fresno			As of August 23, 2004, C&D debris will be banned from disposal at the County-operated American Avenue and Coalinga Landfills.
	Los Angeles			At least 50 percent, determined by weight, of all project C&D debris must be recycled or reused unless a lower percentage is approved by the director upon determination that recycling or reuse of 50 percent of all such materials is not reasonably feasible
	Regional District of Kootenay Boundary (British Columbia)	●	Endorsed the concept of Zero Waste in Nov. 2000; established Reuse centers, producing marketable compost from greenwaste.	Ban on recyclable products and yard and garden waste from landfills; charging variable tipping fees.
	Regional District of Nanaimo, Vancouver Island, British Columbia	●	User pays residential waste collection, curbside recycling programs, promotion of backyard composting	Ban on paper, metal and other recyclables from being landfilled
	Santa Cruz	●	Curbside recycling program; county sponsored recycling drop-off; woodwaste and yardwaste drop-off; county sponsored home composting; county sponsored reuse; GreenCycle program	
	San Diego			Ban on all materials deemed recyclable
	San Luis Obispo	●		Ban on application of biosolids
	San Mateo			100% of inert solids and at least 50% of the remaining C&D debris tonnage shall be diverted
	Sonoma			If amounts of C&D debris greater than 10% are found, customers will be charged 25% more for each load. The surcharge pays for separation for recycling loads at a "mixed C&D recycling facility" located at Central landfill
	South Australia	●	Currently developing its 'Metropolitan Waste to Resources Plan'; S.Australian government adopting a Zero Waste vision	Landfill levy; container deposit legislation
	Ventura		Commercial Generator Waste Diversion Program: all commercial generators shall separate or cause to be separated from refuse and shall arrange for all materials on the Directors list of commercial recyclables.	
	Western Australia		Released its 'Towards Zero Waste by 2020' document.	
Cities	Atherton			It is required that at least the following specified percentages of the waste tonnage of demolition and construction debris generated from every other demolition, remodeling and construction project shall be diverted from going to landfill by using, recycling, reuse and diversion programs: Demolition-50% of waste tonnage including concrete and asphalt and 15% of waste tonnage excluding concrete and asphalt; Construction and remodeling-50% of waste tonnage
	Berkeley		Residential curbside recycling, commercial business and apartment recycling, commercial food waste collection, plant debris collection every other week	
	Canberra, Australia	●	Resource recovery facilities throughout the city including recycling depots, greenwaste facilities, pain recycling, Resource Recovery Centers and a major Resource Recovery Estate; 'Drum muster' program: collects and disposes of rigid metal and plastic containers. Community recycling initiatives.	

	Declared Zero Waste	Sample Programs	Sample Policies/Regulations/Ordinances
Candon City, Ilocos Sur, Philippines	●	Material Recovery Facility	
Carrboro, NC		Curbside recycling; drop-off centers; commercial glass and foodwaste recycling. Sales on yard mulch from landfills; 100% recovery from landfills	Orange County Waste Reduction, Reuse and Recycling Fee; no C&D debris, or contractor cut tree debris accepted
Castro Valley			A Waste Management Plan must be submitted indicating the following: the estimated volume or weight of project C&D debris, the maximum volume of weight of such materials that can be feasibly diverted via reuse or recycling, the vendor or facility that the applicant proposes to use to collect or receive that material, and the estimated volume or weight of C&D materials that will be landfilled.
Cotati			A $200 deposit is required and shall be refunded after proof of reuse, recycling or attempts thereof; all structures and construction materials to be demolished shall be made available for salvage prior to demolition
Edmonton, Canada	●	Waste and recyclables processed at Edmonton Waste Management Centre which houses the Composting Facility and Materials Recovery Facility; 70% diversion from landfills	
Guelph, Ontario		Wet+Dry Program: "wet" consists of organic kitchen and yard waste, plus food contaminated packaging, diapers, pet waste, floor sweeping, and vacuum cleaner catchings; "dry" consists of all dry material, including recyclable and non-recyclable material	
Half Moon Bay			Requires a person taking out a building permit (valued at $5,000 or more) to complete a C&D Debris Waste Management Plan which includes: contractor and project identification information, procedures to be used, materials to be re-used and recycled, and materials disposed, estimated quantities of materials, and names and locations of re-use and recycling facilities, and disposal facilities.
Kovalam, India	●	Kovalam Cleanup Months: discarded plastic bottles were fished out of ponds, wetlands, and homesteads; bio-gas facilities in local hotels	
La Habra			A minimum of 50% must be diverted from residential additions, tenant improvements, new structures and demolition projects
Municipality of Linamon, Lanao del Norte, Philippines	●		
Municipality of Pilar, Sorsogon, Philippines	●	Program set up with Intel on community waste	
Municipality of San Isidro, Nueva Ecija, Philippines	●	Mother Earth Unlimited will launch a Zero/Ecological Waste Program	
Municipality of Sigma, Capiz, Philippines	●		Bill RA 9003: mandates the segregation of waste at source collection and the phasing out of open dumping; ban on open burning of solid waste; nonsegregation of waste is illegal; phases out nonrecyclable consumer packaging materials; calls for the integration of solid waste-management concerns into the school curriculum; mandates the est. of recycling centers at every barangay nationwide; requires the preparation of 10-year solid waste-management plans
New York		Solid Waste Management Plan: contract with Hugo Neu Corp. for the processing and marketing of metal, glass and plastic recyclables (MGP). The development of an MGP processing facility in the city. Goal of 25% diversion of recyclable thru its curbside program by 2007. 70% recycling diversion rate for the city's combined residential and commercial waste stream by 2015; infrastructure for processing, marketing and exporting recyclables; reduction in the price of processing MGP from the curbside program.	
Oakland			A Waste Reduction and Recycling Plan must be approved to obtain a building permit for C&D and remodeling projects.

	Declared Zero Waste	Sample Programs	Sample Policies/Regulations/Ordinances
Sacramento			Statement of Recycling Information is required for each new commercial, office, industrial, public/quasi-public, and multi-family residential development; the Statement shall include: a diagram to chart the flow of recyclable material site plan to include the location and design specifications, construction plan, demolition plan, education/ public relations program, and a Statement of Recycling Information
San Francisco		Adopted a goal of 75% landfill diversion by 2010 in 2002; long term goal of Zero Waste with the date set once 50% diversion is met; residential and business food scraps collection. The City is considering a paper or plastic shopping bag tax on grocery stores that report more than $2 million in annual sales.	All construction projects with a total projected cost of $90,000 or more are required to enter a contract with the City Department that minimizes C&D debris disposal; adopted the Precautionary Principle as city and county policy on June 17, 2003.
San Jose		Recycle: cans, cartons, brown, green, and clear glass bottles and jars, plastics, misc. plastic bags, paper, polystyrene, scrap metals, misc. textiles. Yard trimmings collection. Composting and Greencycling programs. New recycling tops on the city's public garbage cans CDDD Program: when one applies for a project permit the City will assess a deposit based on the square footage and type of project listed on the permit receipt.; a C&D debris management plan must be implemented (materials may be taken to a CDDD-Certified facility for recovery/recycling). An application for refund of the deposit may be filed..	
Santa Monica			All C&D projects the total costs of which are, or are projected to be, $50,000, or are 1,000 sq.ft. or greater hall be required to divert at least 60% of all project-related C&D material; compliance with this Chapter shall be included as a condition of approval on any construction or demolition permit issued
Santa Rosa		Construction and demolition debris box franchise: an agreement between any person or entity who engages in providing C&D debris box collection service and the City.	
Seattle	●	Collection of garbage, recyclables and yard waste; city subsidized compost and grasscycling programs; city funded education programs; establishment of contracting system which encourages competition and supports multiple service providers; composting facility located in Maple Valley;	City of Seattle Ordinance #121372 prohibits the disposal, effective January 1, 2005, of certain recyclables from residential, commercial and self-haul garbage.
Toronto	●	Green Bin Program: allows participants to put organics out for separate collection along with garbage and recycling. Yellow Bag Program: encourages commercial customers to decrease garbage while increasing recycling and organics collection	Landfill ban on organics, wood, cardboard, and toxics; levy on plastic shopping bags

APPENDIX F

DIVERSION RATES FOR CALIFORNIA CITIES

DIVERSION RATES FOR CALIFORNIA CITIES
(latest data available through the CIWMB)

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
Adelanto	20,002	30	2003
Agoura Hills	21,784	21	2003
Alameda	71,805	64	2003
Alameda-unincorporated	134,800 (1999)	56	2003
Albany	16,400	62	2003
Alhambra	87,754	66	2003
Alpine-unincorporated	1,190 (1999)	23	2003
Alturas	2,877	27	2003
Amador County Integrated Solid Waste Management Authority	35,100 (2000)	53	2003
American Canyon	13,135	-33	2003
Anaheim	332,361	49	2003
Angels Camp	3,150 (2005)	-8	2003
Antioch	101,124	34	2003
Apple Valley	60,076	30	2003
Arcadia	55,443	70	2003
Arcata	16,891	42	2003
Arvin	14,009	25	2003
Atherton	7,067	34	2003
Auburn	12,522	47	2003
Avalon	3,312	36	2003
Avenal	15,813	51	2003
Azusa	46,962	46	2003
Bakersfield	271,035	17	2003
Baldwin Park	78,747	4	2003
Banning	27,284	39	2003
Barstow	23,073	54	2003
Beaumont	15,083	60	2003
Bell	37,964	21	2003
Bell Gardens	45,491	46	2003
Bellflower	74,863	32	2003
Belmont	24,499	48	2003
Benicia	26,941	56	2003
Berkeley	102,049	46	2003
Big Bear Lake	5,889	66	2003
Blue Lake	1,139	78	2003
Blythe	21,679	32	2003
Bradbury	952	62	2003
Brawley	22,010	43	2003

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
Buena Park	78,934	44	2003
Burbank	103,359	56	2003
Burlingame	28,387	47	2003
Butte County Regional Waste Management Authority	203,171 (2000)	23	2003
Calabasas	20,889	36	2003
Calaveras-unincorporated	35,400 (1999)	19	2003
Calexico	32,517	34	2003
California City	11,221	38	2003
Calimesa	7,633	43	2003
Calipatria	7,601	49	2003
Camarillo	60,445	54	2003
Campbell	37,149	39	2003
Canyon Lake	10,941	54	2003
Capitola	9,802	48	2003
Carlsbad	87,372	48	2003
Carmel-by-the-Sea	4,078	52	2003
Carpinteria	14,037	47	2003
Carson	93,747	68	2003
Cathedral City	48,528	44	2003
Cerritos	52,800	38	2003
Chico	67,509	49	2003
Chino	71,928	39	2003
Chino Hills	73,886	37	2003
Chowchilla	11,127 (2000)	58	2003
Chula Vista	199,060	51	2003
Claremont	34,964	55	2003
Clayton	11,042	55	2003
Clearlake	14,225	45	2003
Clovis	78,558	45	2003
Coachella	28,021	43	2003
Coalinga	11,668 (2000)	44	2003
Colfax	1,667	63	2003
Colma	1,216	47	2003
Colton	50,602	49	2003
Colusa County Regional Agency	18,804 (2000)	25	2003
Commerce	13,292	34	2003
Compton	95,835	31	2003
Concord	124,977	40	2003
Contra Costa/Ironhouse/Oakley Regional Agency	N/A	37	2003
Corona	142,454	48	2003
Coronado	23,784	50	2003
Costa Mesa	109,563	54	2003
Covina	45,160	43	2003
Cudahy	25,236	48	2003

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
Culver City	39,788	49	2003
Cupertino	50,479	48	2003
Cypress	47,215	62	2003
Daly City	100,819	27	2003
Dana Point	35,745	33	2003
Danville	42,547	62	2003
Davis	64,348	40	2003
Del Mar	4,449	54	2003
Del Norte Solid Waste Management Authority	N/A	44	2003
Del Rey Oaks	1,639	60	2003
Delano	42,801	43	2003
Desert Hot Springs	17,902	20	2003
Diamond Bar	58,160	57	2003
Dixon	16,210	65	2003
Downey	110,360	40	2003
Dublin	35,581	48	2003
East Palo Alto	31,915	75	2003
El Cajon	95,159	45	2003
El Centro	37,985	56	2003
El Dorado-unincorporated	120,600 (1999)	27	2003
El Monte	121,740	57	2003
El Paso Robles	26,413	32	2003
El Segundo	16,483	76	2003
Emeryville	7,325	48	2003
Encinitas	60,340	48	2003
Escalon	6,855	64	2003
Escondido	136,093	49	2003
Eureka	25,808	38	2003
Fairfield	102,762	38	2003
Ferndale	1,388	30	2003
Fillmore	14,949	18	2003
Firebaugh	6,688	47	2003
Folsom	62,628	27	2003
Fontana	151,903	46	2003
Fort Bragg	6,867	-17	2003
Fortuna	10,868	22	2003
Foster City	28,866	35	2003
Fountain Valley	55,747	54	2003
Fowler	4,398	78	2003
Fremont	204,525	57	2003
Fresno	451,455	14	2003
Fresno-unincorporated	176,400 (1999)	14	2003
Fullerton	131,249	51	2003
Galt	22,578	12	2003
Garden Grove	167,029	47	2003

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
Gardena	59,941	1	2003
Gilroy	43,817	54	2003
Glendale	200,499	40	2003
Glendora	50,853	44	2003
Glenn County Waste Management Regional Agency	26,453 (2000)	40	2003
Gonzales	8,510	45	2003
Grand Terrace	12,205	46	2003
Grass Valley	11,629	52	2003
Greenfield	12,953	41	2003
Guadalupe	5,869	42	2003
Half Moon Bay	12,143	22	2003
Hawaiian Gardens	15,357	40	2003
Hawthorne	86,173	47	2003
Hayward	141,336	37	2003
Hemet	65,044	52	2003
Hermosa Beach	19,429	42	2003
Hesperia	69,179	35	2003
Highland	48,516	37	2003
Hillsborough	10,578	40	2003
Holtville	5,536	-3	2003
Humboldt-unincorporated	67,600 (1999)	69	2003
Huntington Beach	194,248	65	2003
Huntington Park	63,139	32	2003
Huron	6,991	36	2003
Imperial	8,885	34	2003
Imperial Beach	27,151	45	2003
Imperial-unincorporated	35,150 (1999)	82	2003
Indian Wells	4,481	58	2003
Indio	58,241	52	2003
Industry	789	64	2003
Inglewood	115,208	33	2003
Inyo Regional Waste Management Authority	N/A	30	2003
Irvine	170,561	51	2003
Irwindale	1,480	80	2003
Isleton	846	53	2003
Kerman	9,765	24	2003
Kern-unincorporated	273,800 (1999)	50	2003
King City	11,323	78	2003
Kings Waste and Recycling Authority	N/A	46	2003
Kingsburg	10,504	52	2003
La Canada Flintridge	20,980	31	2003
La Habra	59,703	48	2003
La Habra Heights	5,963	47	2003

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
La Mesa	54,571	30	2003
La Mirada	48,887	52	2003
La Palma	15,903	70	2003
La Puente	42,143	26	2003
La Quinta	23,694	57	2003
La Verne	33,005	53	2003
Lafayette	24,574	48	2003
Laguna Beach	24,126	44	2003
Laguna Hills	32,181	21	2003
Laguna Nigel	64,326	42	2003
Laguna Woods	17,962	56	2003
Lake Elsinore	34,914	33	2003
Lake Forest	76,738	65	2003
Lakeport	5,186	53	2003
Lake-unincorporated	39,200 (1999)	39	2003
Lakewood	81,300	35	2003
Lancaster	125,896	40	2003
Lassen Regional Solid Waste Management Authority	N/A	29	2003
Lathrop	12,181	74	2003
Lawndale	32,490	37	2003
Lemon Grove	24,935	30	2003
Lincoln	23,080	64	2003
Livermore	77,744	52	2003
Lodi	61,027	51	2003
Loma Linda	20,089	39	2003
Lomita	20,548	40	2003
Lompoc	41,167	53	2003
Long Beach	475,460	43	2003
Loomis	6,312	42	2003
Los Alamitos	11,697	48	2003
Los Altos	27,173	48	2003
Los Altos Hills	8,097	51	2003
Los Angeles	3,819,951	62	2002
Los Angeles-unincorporated	1,036,300 (1999)	11	2003
Los Gatos	27,976	53	2003
Madera	47,952	48	2003
Madera-unincorporated	65,800 (1999)	29	2003
Malibu	13,223	34	2003
Mammoth Lakes	7,304	28	2003
Manteca	59,500	36	2003
Maricopa	1,154	59	2003
Marina	25,101	55	2003
Marin-unincorporated	N/A	46	2003
Mariposa-unincorporated	16,150 (1999)	39	2003
Martinez	36,595	38	2003

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
Maywood	28,751	33	2003
McFarland	10,125	24	2003
Mendocino-unincorporated	60,600 (1999)	26	2003
Mendota	8,473	8	2003
Menlo Park	29,811	45	2003
Merced County Solid Waste Regional Agency	210,554 (2000)	42	2003
Millbrae	20,040	61	2003
Milpitas	63,081	39	2003
Mission Viejo	95,831	42	2003
Modesto	2,068,872	34	2003
Modoc-unincorporated	6,800 (1999)	8	2003
Mono-unincorporated	5,550 (1999)	56	2003
Monrovia	37,996	54	2003
Montclair	34,776	41	2003
Monte Sereno	3,446	81	2003
Montebello	63,747	59	2003
Monterey	29,960	64	2003
Monterey Park	62,213	64	2003
Monterey-unincorporated	105,700	55	2003
Moorpark	35,168	50	2003
Moraga	16,701	58	2003
Moreno Valley	157,063	41	2003
Morgan Hill	34,128	40	2003
Mountain View	69,366	51	2003
Murrieta	66,729	3	2003
Napa	75,560	-23	2003
Napa-unincorporated	31,300 (1999)	-10	2003
National City	58,292	50	2003
Needles	5,276	39	2003
Nevada City	3,009	56	2003
Nevada-unincorporated	65,300 (1999)	20	2003
Newark	43,042	56	2003
Newport Beach	78,043	45	2003
Norco	26,265	55	2003
Norwalk	107,155	29	2003
Oakland	398,844	50	2003
Oceanside	167,082	40	2003
Ojai	8,006	41	2003
Ontario	167,402	34	2003
Orange	132,197	32	2003
Orange Cove	8,993	85	2003
Orange-unincorporated	218,800	45	2003
Orinda	18,091	53	2003
Oroville	13,137	34	2003
Oxnard	180,872	66	2003

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
Pacific Grove	15,444	56	2003
Pacifica	37,291	37	2003
Palm Desert	45,624	61	2003
Palm Springs	45,228	57	2003
Palmdale	127,759	42	2003
Palo Alto	57,233	57	2003
Palos Verdes Estates	13,827	48	2003
Paramount	56,660	45	2003
Parlier	12,358	64	2003
Pasadena	141,114	48	2003
Perris	41,208	41	2003
Pico Rivera	65,317	32	2003
Piedmont	10,846	64	2003
Pittsburg	61,004	44	2003
Placentia	48,210	49	2003
Placer-unincorporated	96,400 (1999)	46	2003
Placerville	10,123	44	2003
Pleasant Hill	33,859	36	2003
Pleasanton	65,982	32	2003
Plumas-unincorporated	18,250 (1999)	37	2003
Point Arena	478	23	2003
Port Hueneme	21,837	50	2003
Portola	2,219	-47	2003
Portola Valley	4,418	64	2003
Poway	49,201	52	2003
Rancho Cucamonga	151,640	32	2003
Rancho Mirage	15,297	44	2003
Redding	87,579	34	2003
Redlands	67,859	34	2003
Redwood City	73,472	36	2003
Reedley	21,549	62	2003
Rialto	98,091	44	2003
Ridgecrest	25,635	64	2003
Rio Dell	3,148	27	2003
Rio Vista	6,142	63	2003
Ripon	12,150	69	2003
Riverside	281,514	57	2003
Riverside-unincorporated	401,400 (1999)	47	2003
Rocklin	46,937	39	2003
Rolling Hills	1,931	49	2003
Rolling Hills Estates	7,982	50	2003
Roseville	98,359	38	2003
Sacramento	445,335	50	2003
Sacramento County/City of Citrus Heights Regional Agency	1,312,014	28	2003
Salinas	147,840	54	2003

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
San Bernardino	195,357	42	2003
San Bernardino-unincorporated	292,300 (1999)	40	2003
San Bruno	39,602	47	2003
San Buenaventura	104,140	61	2003
San Carlos	27,004	39	2003
San Clemente	57,768	25	2003
San Diego	1,266,753	44	2003
San Diego-unincorporated	469,300 (1999)	25	2003
San Dimas	36,000	67	2003
San Fernando	24,253	54	2003
San Francisco	751,682	32	2003
San Gabriel	40,987	31	2003
San Jacinto	26,929	37	2003
San Joaquin	3,530	72	2003
San Joaquin-unincorporated	131,400 (1999)	62	2003
San Jose	898,349	59	2003
San Juan Capistrano	34,796	51	2003
San Leandro	80,139	40	2003
San Luis Obispo County Integrated Waste Management Authority	44,202	49	2003
San Marcos	64,242	36	2003
San Marino	13,230	29	2003
San Mateo	91,157	47	2003
San Mateo-unincorporated	66,800 (1999)	47	2003
San Ramon	45,907	54	2003
Sand City	304	47	2003
Sanger	20,113	36	2003
Santa Ana	342,510	57	2003
Santa Barbara	88,251	47	2003
Santa Barbara Regional Integrated Waste Management Reporting Authority	2,828,400 (1999)	55	2003
Santa Clara	102,095	49	2003
Santa Clara-unincorporated	105,200 (1999)	56	2003
Santa Clarita	162,742	40	2003
Santa Cruz	54,262	48	2003
Santa Cruz-unincorporated	138,800 (1999)	44	2003
Santa Fe Springs	17,032	76	2003
Santa Maria	81,944	13	2003
Santa Monica	87,162	59	2003
Santa Paula	28,879	26	2003
Santee	52,942	32	2003
Saratoga	29,309	62	2003
Scotts Valley	11,284	61	2003
Seal Beach	24,441	60	2003
Seaside	33,897	46	2003

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
Selma	21,176	12	2003
Shafter	13,720	64	2003
Shasta County Waste Management Authority	163,256 (2000)	60	2003
Sierra County Regional Agency	3,555 (2000)	0	2003
Signal Hill	10,159	34	2003
Simi Valley	117,115	48	2003
Siskiyou County Integrated Solid Waste Management Regional Agency	44,301 (2000)	48	2003
Solana Beach	12,993	50	2003
Solano-unincorporated	20,850 (1999)	32	2003
Soledad	25,248	45	2003
Solvang	5,286	46	2003
Sonoma County Waste Management Agency	458,614 (2000)	36	2003
Sonora	4,632	54	2003
South El Monte	21,776	77	2003
South Lake Tahoe	23,912	41	2003
South Pasadena	24,847	49	2003
South San Francisco	59,415	43	2003
Stanislaus County Regional Solid Waste Planning Agency	446,997 (2000)	50	2003
Stanton	37,853	39	2003
Stockton	271,466	42	2003
Suisun City	26,968	57	2003
Sunnyvale	128,549	56	2003
Taft	6,400 (2000)	70	2003
Tehachapi	11,434	68	2003
Tehama County Sanitary Landfill Regional Agency	56,039 (2000)	40	2003
Temecula	76,836	47	2003
Temple City	36,325	54	2003
Thousand Oaks	124,192	56	2003
Tracy	72,456	50	2003
Trinidad	311	61	2003
Trinity-unincorporated	13,050 (1999)	55	2003
Truckee	14,930	65	2003
Tulare-unincorporated	144,300 (1999)	40	2003
Tustin	68,478	21	2003
Twentynine Palms	25,971	52	2003
Ukiah	15,661	31	2003
Union City	69,309	29	2003
Upland	742,040	42	2003
Upper Valley Waste Management Agency	N/A	52	2003

CITY	POPULATION*	DIVERSION RATE (%)	REPORTING YEAR
Vacaville	94,129	50	2003
Vallejo	119,708	42	2003
Ventura-unincorporated	93,600 (1999)	49	2003
Vernon	93	44	2003
Victorville	74,987	33	2003
Villa Park	6,039	56	2003
Vista	91,813	34	2003
Walnut	31,089	59	2003
Walnut Creek	65,151	55	2003
Wasco	22,476	52	2003
Watsonville	46,159	70	2003
West Contra Costa Integrated Waste Management Authority	N/A	36	2003
West Covina	108,251	52	2003
West Hollywood	36,731	38	2003
West Sacramento	37,897	57	2003
Westlake Village	8,570	49	2003
Westminster	89,493	60	2003
Westmorland	2,100	-6	2003
Whittier	85,368	47	2003
Willits	5,139	5	2003
Winters	6,658	46	2003
Woodland	50,988	34	2003
Woodside	5,256	64	2003
Yolo-unincorporated	21,450	63	2003
Yorba Linda	62,358	49	2003
Yuba/Sutter Regional Waste Management Authority	N/A	34	2003
Yucaipa	46,171	41	2003
Yucca Valley	18,301	59	2003

* 2003 data unless listed otherwise

APPENDIX G

CIWMB
THE ECONOMICS OF RECYCLING

Diversion Is Good for the Economy: Highlights from Two Independent Studies on the Economic Impacts of Diversion in California

March 2003

California Environmental Protection Agency
Integrated Waste Management Board

STATE OF CALIFORNIA

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Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, **Flex Your Power** and visit **www.consumerenergycenter.org/flex/index.html.**

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Introduction

The environmental costs associated with burying or burning garbage (solid waste) should be enough incentive to motivate people to compost, reduce, reuse, recycle, and buy recycled. However, if the environmental costs aren't enough motivation, two independent, pioneering studies suggest that choosing disposal over diversion also has significant economic costs. It turns out that how we handle our garbage can impact our wallets.

While you may not see your garbage as a resource, the materials it contains can be remanufactured into new, valuable recycled-content products. When a truck takes your solid waste away, it doesn't disappear. However, burying solid waste in a landfill does make something disappear . . . the additional jobs, sales, and other economic activity that could be generated when those materials stay in circulation.

Some money will be spent whether we dispose or divert the next ton of waste generated in California. How that money circulates and cycles through our economy determines the economic growth gained (measured in sales, jobs, and income). The process of collecting, transporting, and safely disposing of our solid waste also creates jobs and economic activity. Garbage trucks rumbling down our streets, the ever-present cans and dumpsters, and our monthly solid waste bills are reminders of the economics of waste disposal.

Even though California has made considerable investments in the infrastructure to support composting and recycling, not as many obvious reminders exist for the economics of diversion activities. Diversion activities are usually more decentralized and occur at smaller, less conspicuous locations than solid waste landfills. While solid waste collection and disposal are usually government-sanctioned, -funded and/or -operated, many diversion activities are dependent on the actions of individuals and/or small businesses. For all these reasons, it is much harder to identify and calculate the economic benefits from diversion.

Until recently, very little work had been done on economic impact analyses related to solid waste disposal or diversion. To further our understanding of the impact of solid waste on the economy and to encourage the development of this emerging field of study, the California Integrated Waste Management Board (CIWMB) sponsored two independent economic studies.

George Goldman and Aya Ogishi, researchers at the University of California, Berkeley (UCB) conducted their study titled *The Economic Impact of Waste Disposal and Diversion in California.*

Tim Buwalda at R.W. Beck Inc., worked with the National Recycling Coalition to complete *The California Recycling Economic Information Study* (REI).

The CIWMB's investment ($55,000 for the UCB Study and $78,000 for the REI Study) allowed the researchers to gather and evaluate an entirely new set of data, explore new methods, and start to build new economic models for solid waste disposal and diversion.

Each study is unique, contains a wealth of information, and can be examined individually since they are included as appendices to this brief synopsis. The studies addressed different questions and pursued different goals. The definitions of waste types and data sources varied somewhat, but both used IMPLAN (an input/output economic model) for analysis. While neither independent study was designed to complement, refute, or relate to the other, in the end they had some similar findings and reached some very similar conclusions.

The results from these studies showed that while solid waste disposal may be more centralized, making the economic benefits more obvious, reuse and recycling activities actually create more sales, income, and jobs in California. The studies show that diversion:

- Is a big business, comparable with other large industries in California.
- Is a bigger benefit per ton to the economy than disposal.
- Is already comparable to disposal in its total impact on the statewide economy.

The studies concluded that diversion is good for the economy. This suggests that California's economy will benefit as the state progresses toward its goal of zero waste. Both studies also stressed the importance of developing and supporting markets for recycled materials, so that materials can cycle through the manufacturing process (and economy) multiple times rather than making a relatively short one-way trip through the economy to a landfill.

Goals of the Studies

The main goal of each study has been paraphrased and shortened for readability.

UCB Study Goal: To estimate and compare the economic impacts of the waste disposal and diversion systems statewide and regionally.

REI Study Goal: To document the size and economic impact of the recycling and reuse industry in California as compared to other industries and other states.

Each study attempted to gain perspective and convey information through industry and geographic comparisons:

- The UCB study compared the economic impacts from diversion only with those from the disposal industry by first developing a statewide material flow model including both disposal (landfills and waste-to-energy facilities) and diversion, and then quantifying the economic impacts from both.
- The REI study focused on documenting the size and makeup of only the recycling/reuse industry, comparing the economic impacts from diversion with those from several other major industries within California.
- The UCB study looked at the relative economic impacts of diversion in six different economic sub-regions in California and showed how they aggregate to impact the statewide economy.
- The REI study, as part of the larger nationwide study, ranked California alongside other states and showed how the economic impacts from diversion in California fits within the nationwide economy.

The central goals of each study appear to be fairly similar with regards to diversion; however, the details reveal very different assumptions and approaches that led to differences in the data and methodologies used.

Different Assumptions Shape the Studies

The biggest difference between the assumptions and data used by the two studies was in determining the number of tons diverted in California. Using a more inclusive list of diverted materials and activities, the REI study estimated that approximately 40 million tons of materials from inside and outside of California are handled, recycled, or composted annually within the state. Limiting the universe to materials generated within California and to those materials and activities consistent with the state's 50 percent diversion mandate, the UCB study estimated that 18 million tons of material were recycled or composted in the state. In addition to the challenges always associated with researching new areas, four issues contributed to this tonnage difference between the two studies.

Origin of Materials Diverted

While both studies set California as the key geographic target area, they differ in several significant ways. The UCB study was commissioned to measure the impact that the Integrated Waste Management Act has had on California's economy, so the scope was limited to waste generated within California. The REI study was commissioned to document the entire recycling and reuse infrastructure within California. The UCB study includes only economic impacts derived from the diversion of materials originating within California, while the REI study includes all economic impacts derived from the diversion of materials regardless of their state/nation of origin.

California's industries manufacture many products using feedstock from outside the state. Recycled feedstock imported into California for remanufacturing was included in the REI study but excluded from the UCB study. With several major ports, California also serves as a conduit for many materials, feedstocks, and products moving to and from other states and nations. Economic impacts (for example, intermediate processing, transportation, material brokers, etc.) associated with these materials while in California were included in the REI study but excluded in the UCB study.

Activities Included as Diversion

Both studies estimated the tonnage of materials recycled and composted. Neither study estimated the tonnage of materials source-reduced, reused, or eliminated through waste prevention. However, the REI study did estimate the economic impacts related to reuse. To be consistent with the State's definition of diversion, the UCB study only included recycling, composting, biomass conversion, and alternative daily cover (ADC) use at landfills. To be consistent with their larger nationwide study, the REI study included recycling, reuse, and composting, but it did not consider biomass conversion or ADC to be diversion.

Materials Included as Diversion

Statutory limitations also led the UCB study to exclude a portion of some diverted materials, including inert solids (for example, dirt, concrete, asphalt, etc.), scrap metals, agricultural wastes, and all diversion of used motor oil and tires. To quantify the economic impacts of the entire material-handling infrastructure, the REI study included the diversion of all these materials.

Years Covered by Studies

The UCB study used 1999 diversion amounts, while the REI study estimated and then used 2000 diversion tonnages. In California, diversion has increased annually and as expected, diversion was higher in the REI study.

Do Different Tonnages Mean Different Rates?

Neither study was designed for use in calculating a new statewide solid waste diversion rate. In fact, the UCB study relied on the current goal measurement system for many data inputs. While not consistent with the state's official diversion rate measurement system that reported a 37 percent diversion rate for 1999, the higher diversion amount reported in the REI study would yield a 54 percent statewide diversion rate. One could argue that this higher rate (Figure 1) more accurately reflects California's commitment to principles and investment in the infrastructure for diverting solid waste. These types of differences in methodologies could also help explain why many other states with less developed diversion infrastructure and programs post higher diversion rates than California.

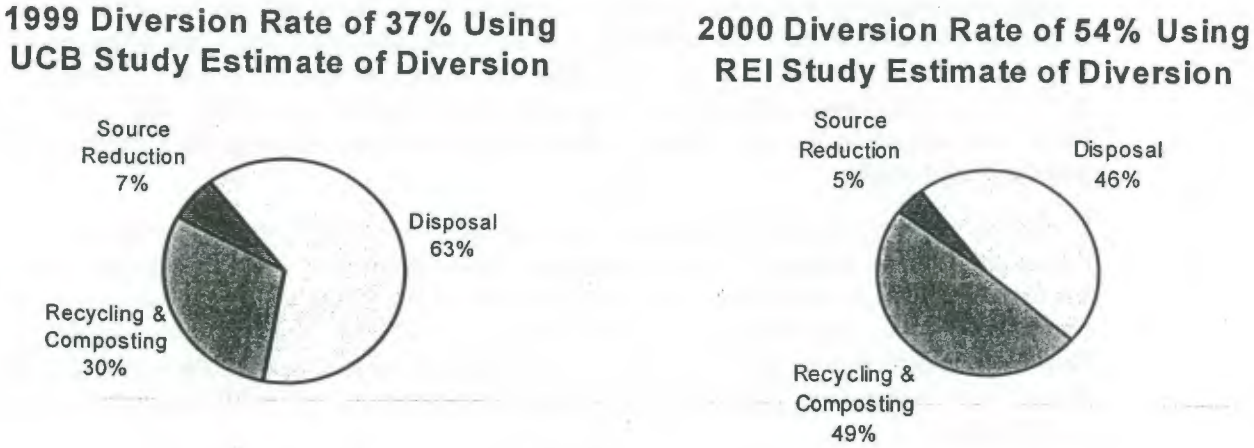

Figure 1. Alternative views of California's waste stream.

Methods of the Studies

While the basic goals and underlying assumptions in each study were quite different, the methods were similar in many ways.

Data Collection

Both studies relied on data primarily from secondary sources. The UCB study used CIWMB data sources whenever they were available, as well as data from the U.S. Department of Commerce, waste industry studies, and targeted industry surveys. The REI study primarily relied on data from the U.S. Department of Commerce, industry studies and experts, industry surveys, and other data derived from a variety of sources.

Economic Analysis Software

Both studies used IMPLAN, an input/output economic model, and analysis software.

Types of Impacts

Both studies examined:

- Direct impacts from establishments involved in the targeted activity (for example, collectors, processors, recyclers, and composting).
- Indirect impacts from supporting establishments (for example, transporters, equipment manufacturers, etc.).
- Induced impacts from these businesses and their employees on the economy (for example, employees purchasing unrelated goods and services).

Output Indicators

The studies yielded several common economic impact indicators: jobs, output, income, and value added. While the exact definitions are different in each study, the following simplified meanings can be more easily understood:

- Jobs = all paid positions (part or full-time, not full-time equivalents) in a given sector.
- Output = all gross sales plus all public outlays in a given sector.
- Sales = all sales and revenues in a given sector.
- Income = all wages, salaries, and benefits in a given sector.
- Value added = enhancement of the value of goods and services by a given sector.

Results of the Individual Studies

In this section, highlights from each study are presented individually, but some similarities and differences will be apparent.

UCB Study

Solid waste (disposal and diversion) is a significant segment of the economy.

Together, the disposal and diversion of solid waste generated in California is "big business" as shown by the following economic indicators for 1999:

- Direct total sales of $9.2 billion.
- Output impact of $21.2 billion.*
- Income impact of $7.9 billion.*
- Value-added impact of $10.7 billion.*
- Jobs added 179,000.*

*Direct, indirect, and induced impacts

Diversion resulting from California's 50 percent diversion mandate has had significant impacts on the state's economy:

- Output impact of $10 billion.*

- Income impact of $4 billion.*
- Value-added impact of $5 billion.*
- Jobs added 85,000.*

*Direct, indirect, and induced impacts.

More tons are disposed but overall diversion has a similar economic impact.

In 1999, California generated approximately 56 million tons of solid waste, with 38 million tons disposed and 18 million tons diverted. As illustrated in Figure 2, the UCB study shows that the economic impacts from diverting waste are comparable to those from disposal of the residual solid waste.

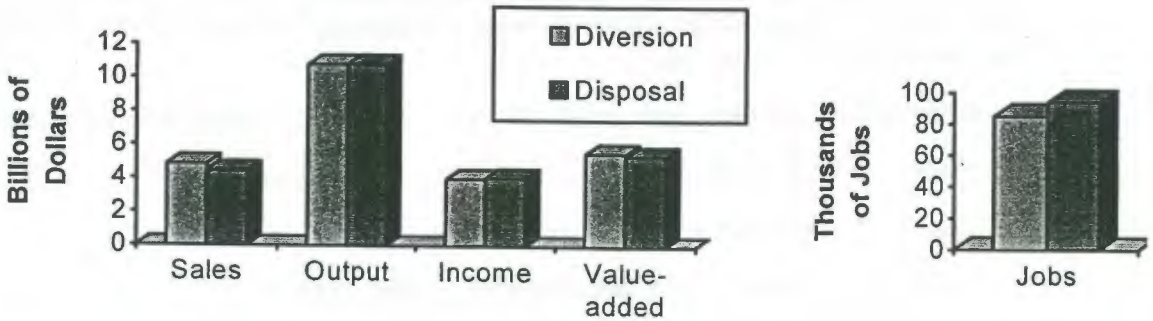

Figure 2. Economic impacts of disposal and diversion from California sources and in compliance with the State's Integrated Waste Management Act.

While the numbers were different, the conclusion was the same in the REI study: "Despite the fact that more discards are disposed than recycled, it is not surprising that the recycling and reuse industry is larger than the waste management industry. This is because recycling and reuse are inherently value-adding, whereas disposal is not, and value-adding processes support jobs and economic activity."

Diversion's economic impacts per ton of material are twice that of disposal.

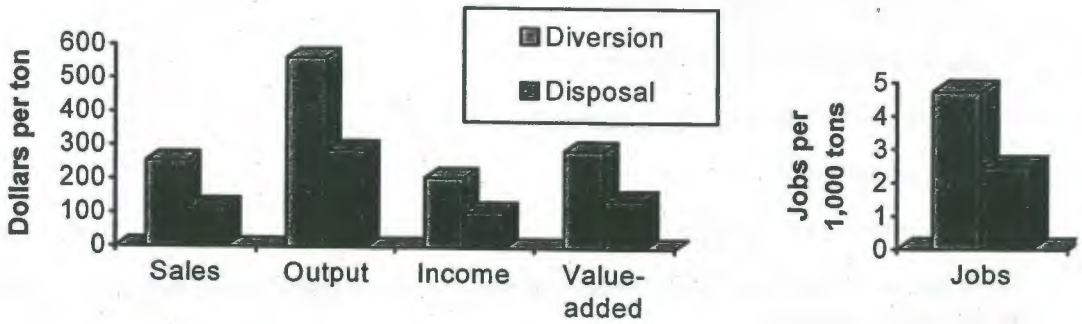

Figure 3. Economic impacts per ton of disposal and diversion.

Figure 3 shows the relative impact per ton from disposal and diversion. It clearly illustrates that keeping materials out of the landfill and circulating in the product stream benefits the economy. Diversion has doubled or nearly doubled the per-ton economic impact of disposal. The UCB study stressed the importance of developing and supporting markets for recycled materials as a key to further economic benefits from diversion.

Statewide economic benefits of diversion come primarily from three regions.

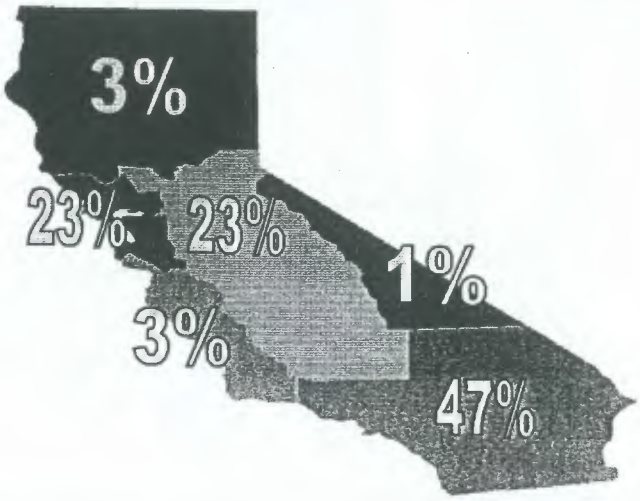

Figure 4. Percent of statewide diversion economic impact in six regions.

As might be expected, Figure 4 shows that the highest economic impacts from diversion occurred in those regions of the state with the most people, industry, and solid waste. The UCB study found that regions with less diversion infrastructure, less solid waste feedstock, and locations further from markets for recycled materials show much smaller relative impacts.

REI Study

Recycling and reuse is a significant segment of the economy.

The REI study quantified the recycling and reuse industry in California and found it to be a highly diverse industry that is well established and organized. The study found that California's recycling and reuse industry consists of:

- 5,300 establishments.
- 84,000 direct employees.
- $2.2 billion annual payroll.
- $14.2 billion annual revenues.

The REI study found that the recycling and reuse industry is a viable industry that adds jobs and strength to California's economy. The REI study strongly recommended that the recycling industry be supported with incentives and funding: "Investments at the local level in collection

and processing of recyclables and public policies that favor recycling and reuse certainly support large private sector investments in downstream processing and manufacturing."

Within recycling, manufacturing is the biggest contributor to the economy.

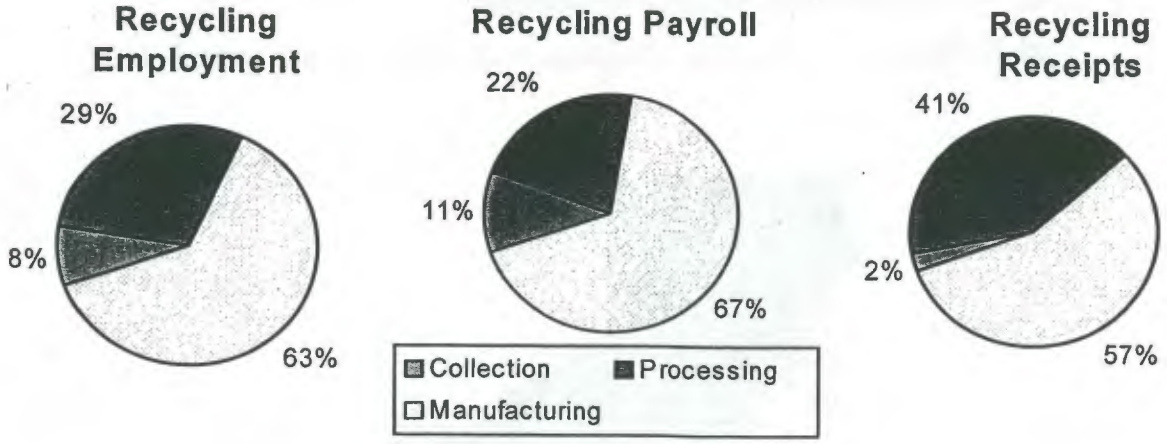

Figure 5. Economic indicators showing that recycling manufacturing is the dominant economic driver.

The economic benefits related to recycling far exceed those of reuse. Within recycling employment, payroll and revenue come primarily from recycling manufacturing, with collection and processing contributing far less. This again underlines the importance of building and supporting markets for recycled-content products. If materials are only collected and then processed but not turned into new products, then the majority of the economic benefit is lost. As shown in Figure 5, the recycling manufacturing sector is the downstream consumer of recovered materials and accounts for 63 percent of employment and 57 percent of receipts.

While the numbers were different, the UCB study supported this conclusion, "Creating markets to accept more recyclable and compostable materials would be the key to stimulating more economic activities and higher impacts in the state."

Materials were identified as key contributors.

Within recycling manufacturing, the REI study also looked at differences between materials.

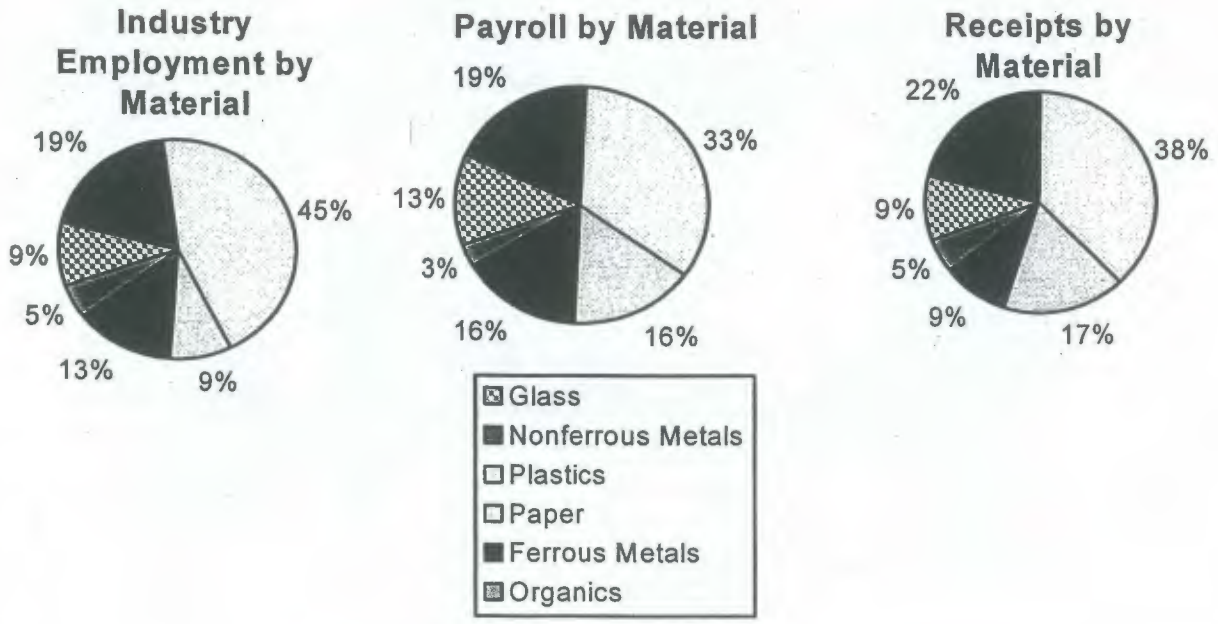

Figure 6. REI study economic impacts by material diverted.

The UCB study also looked at differences between materials.

The results are very different regarding the total size of the material impacts and the contributions of the various materials, particularly plastics. When plastics are removed from the analysis, the pie charts from the two studies are much more similar. The contributions related to plastics will be one of several issues to examine in future studies.

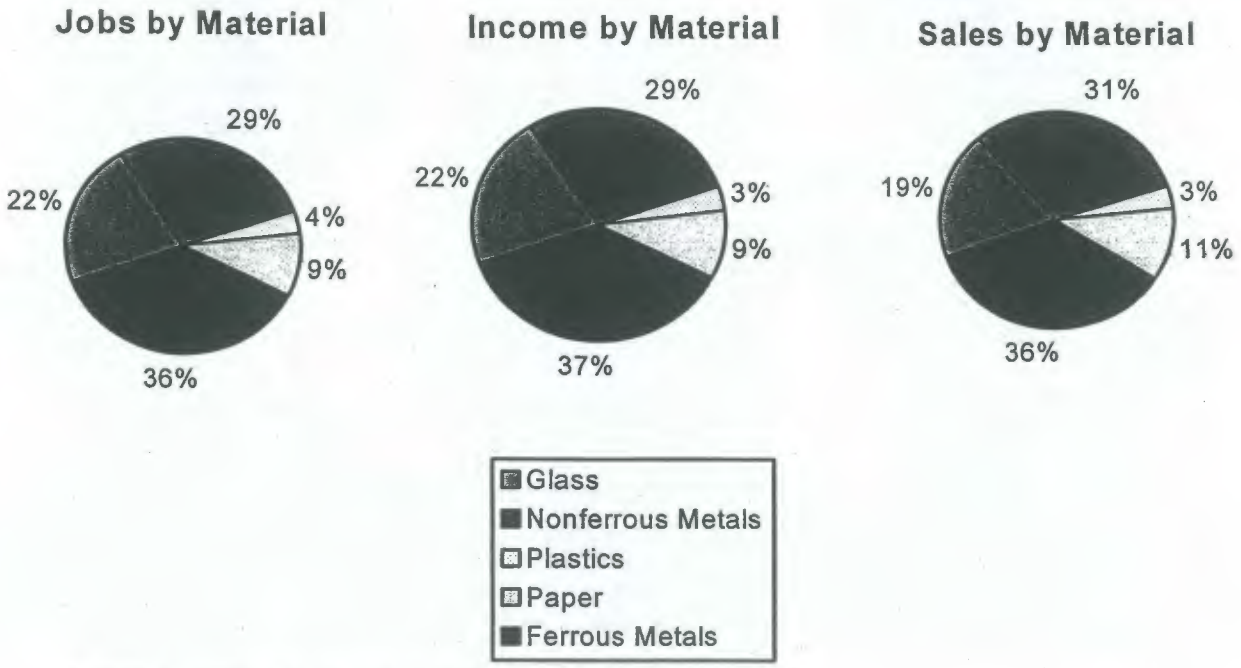

Figure 7. UCB study of economic impacts by material diverted.

The REI Study diversion is comparable to other major industries.

Within California, recycling and reuse activities make up a major industry. This provides direct employment comparable to the manufacturing of machinery and the motion picture/video industry.

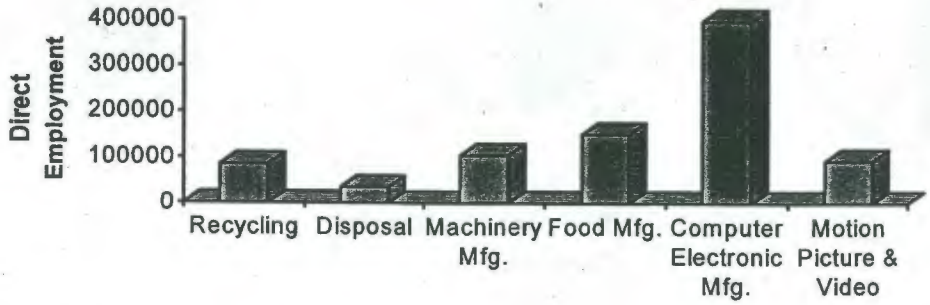

Figure 8. Economic sector comparison.

California is among the top states in employment in recycling and reuse.

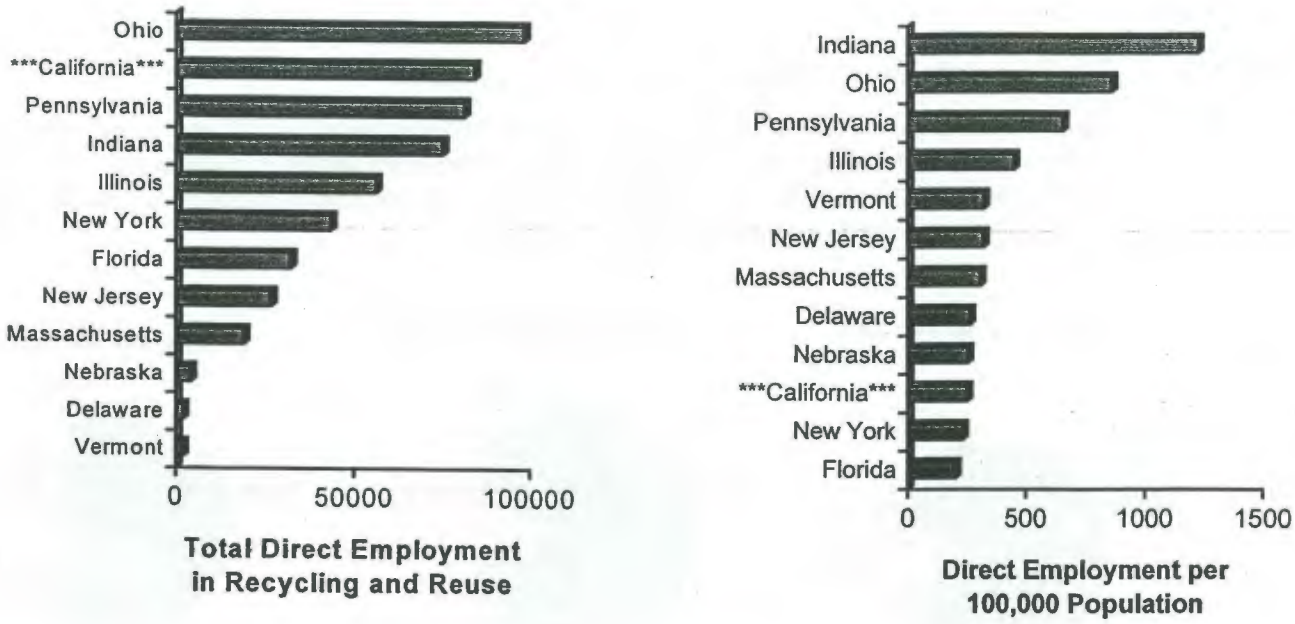

Figure 9. A comparison of recycling employment in California and other states.

A part of the larger national study to compared the impacts of recycling and reuse between states. According to this comparison, California has the second-highest direct employment in recycling and reuse. The other top states are heavily industrial, and a large part of their economic impacts are related to manufacturing using recycled feedstocks. California's per capita employment in this sector is lower. This could be a reflection of many things, including economies of scale found in larger states.

Similar Findings in Studies

Despite differences in their findings, both studies support the concept that solid waste diversion is a big business (for example, bigger than disposal, comparable with other large industries in California, etc.). The large and small businesses throughout California that reuse, collect, and process recycled feedstock—and those that manufacture products with recycled content—cycle billions of dollars through California's economy every year. While the overall economic impacts are different due to the different definitions and universes studied, the per-ton economic impacts from diversion were surprisingly similar.

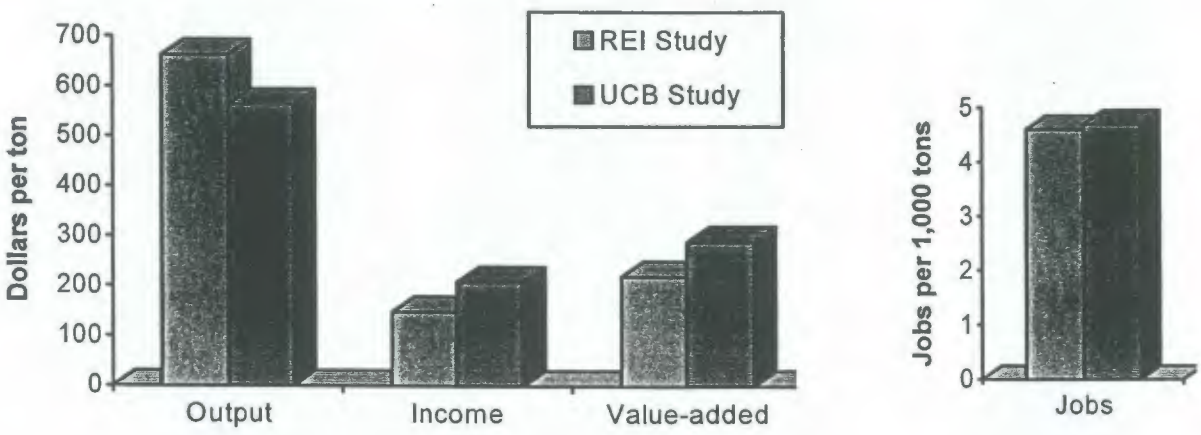

Figure 10. Similar economic impacts per ton of diversion are apparent in both studies.

Both studies concluded that building and supporting markets for recycled materials is the key to more economic growth from diversion. Although collecting and processing materials are important generators of jobs, they do not contribute as much to the economy as remanufacturing recycled feedstock into new products and using compost to grow the state's crops. Recycling and reuse are important in preventing the waste of resources and the growth of landfills, but buying recycled is the key to sustained economic growth from diversion.

Summary

While future studies will surely refine the methods, improve the quality of the data on the size and composition of the waste stream, and provide a better understanding of the economics of disposal and diversion, these two groundbreaking studies have made large strides into a previously uncharted area. It is widely accepted that diversion is good for the environment, but both of these economic studies have now shown that diversion is good for the economy too.

CONSTRUCTION AND DEMOLITION DEBRIS WASTE MANAGEMENT

DIVERSION REQUIREMENTS FOR CITY OF LOS ANGELES CONTRACTS

(Proposed April 2005)

Entry for General Conditions

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

The Contractor shall divert, at a minimum, 75% of all inert debris and 50% of all other demolition and construction debris from the project. A Waste Management Plan, as detailed in the Construction and Demolition Waste Management (CDWM) Specification, shall be submitted by the contractor to the Engineer and approved by the Engineer before work may begin. The Waste Management Plan must show that at least 75% of all inert construction and demolition waste material and 50% of all other construction and demolition waste material generated by the project will be recycled or reused. If the contractor believes it is not feasible to attain this goal for this project, the contractor may apply for an exemption at the time the Waste Management Plan is submitted.

A completed Solid Waste Diversion and Disposal Report and all required documentation must be submitted with every Contract Payment Request form as detailed in the Construction and Demolition Waste Management Specification.

Upon completion of the work and as a condition of final acceptance, the contractor shall submit to the Engineer the final Solid Waste Diversion and Disposal Report that demonstrates compliance with the Waste Management Plan approved for this project.

Failure to meet the minimum diversion requirements as detailed above will result in penalties as detailed in the (CDWM) Specifications. The contractor will have the right to appeal any penalties imposed by this section as detailed in the (CDWM) Specifications.

DEPARTMENT OF PUBLIC WORKS

JOINT BOARD REPORT
BUREAU OF SANITATION
BUREAU OF ENGINEERING
BUREAU OF CONTRACT ADMINISTRATION
BOARD REPORT NO. 1
FEBRUARY 17, 2005

CD: ALL

CONSTRUCTION AND DEMOLITION RECYCLING REQUIREMENTS FOR ALL DEPARTMENT OF PUBLIC WORKS SPONSORED CONSTRUCTION PROJECTS

RECOMMENDATION

1. Adopt this policy for all Public Works Construction Projects.~~Approve this report.~~
2. Approve the Construction and Demolition Waste Management Specification requiring a minimum mandatory diversion rate of 75% for inert debris and 50% for all other construction and demolition debris for all construction and demolition projects sponsored by the Department of Public Works.
3. Approve the proposed addition to the Master General Conditions.
4. Direct the Bureau of Contract Administration to enforce compliance of the Master General Specification and the Construction and Demolition Waste Management Specification.

TRANSMITTAL

1. Proposed Construction and Demolition Waste Management (CDWM) Specifications.
2. Proposed Paragraph for insertion into the Master General Conditions.
3. City Council motion to include Recycling Specifications in all Building and Safety contracts for single site and annual demolition bids and contracts (C.F. 99-2004 adopted June 02, 2000)

DISCUSSION

The City of Los Angeles has adopted a waste diversion goal of 70% by the year 2020. To reach this goal it is essential to have an active recycling program for City construction projects and accurate reporting of the achieved diversion. AB939 requires the City to report on waste generation and diversion activities within the City.

The Solid Resources Citywide Recycling Division is developing and implementing a Construction and Demolition Waste recycling program. The development of the program has been a collaborative effort between the Bureau of Sanitation, Bureau of Engineering, and Bureau of Contract Administration.

The new Construction and Demolition Waste diversion program will be implemented in phases. The first phase, addressed in this report, reinforces the City's existing mandatory reporting requirements for City contracted work managed by the Department of Public Works and establishes minimum diversion rates. The second phase will evaluate expanding the mandatory C&D diversion program citywide, i.e., to cover all commercial and governmental construction activities as well as construction under the jurisdiction of the Board of Public Works. ~~that will require all building projects in the City to meet minimum diversion rates and submit waste diversion plans and reports.~~ The phased approach will allow for the lessons learned on the Board's projects to guide the development of sound programs and improved infrastructure.

The Bureaus of Sanitation, Contract Administration, and Engineering developed the Solid Resource Management (SRM) Specification that is currently being added to many construction contracts for the City of Los Angeles. The SRM Specification has guidelines and information on how to reduce the amount of waste landfilled from construction projects. The SRM Specification requires that a waste management plan be completed before construction begins. It also contains requirements for documenting the waste produced at a construction site and its destination. However, the SRM Specification currently used does NOT set minimum diversion rates but merely requires

that the contractor divert to the greatest extent possible. It is also not a mandatory part of existing contracts. In developing this new program, t~~T~~he existing SRM Specification has been revised, strengthened, and renamed the Construction and Demolition Waste Management (CDWM) Specifications (Transmittal 1)

The proposed addition to the Master General Conditions (Transmittal 2) will require that the CDWM Specification be incorporated into all projects managed and contracted by the Department of Public Works. The proposed CDWM Specification establishes minimum diversion rates of 75% for inert debris and 50% for the remaining construction and demolition debris. The specification allows an exemption to the diversion rate requirements for a project in certain situations. If the contractor requests an exemption for cause, the assigned ~~City project manager~~Engineer will review the merits of such requests.

Staff has worked closely with the Bureau of Engineering and the Bureau of Contract Administration (BCA) in the development of the proposed CDWM Specification. The proposed CDWM Specification will also give the City added leverage to ensure that the diversion rates are met, where feasible. The contractor will be required to submit disposal and diversion reports with all of their requests for progress payments. This will allow the BCA Inspector ~~project manager~~ to monitor the contractor's diversion effort. The City will have the ability to assess a per ton penalty for material not diverted in accordance with the approved Solid Waste Management Plan. While the required diversion and reporting program may cause an unmeasurable additional cost in the bid, the ~~D~~disposal of recyclable or re-useable material has a direct negative impact on the City and its ability to meet the state mandated goals. There is also a negative impact to the residents and businesses in the City. As local landfill space is used up, the City will have to rely on more costly landfill options and increase collection rates for both residents and businesses. The Bureau of Sanitation ~~Staff~~ proposes a penalty of $100 for each ton of C&D material not diverted that is needed to achieve the minimum diversion rates.

As mentioned above, the proposed CDWM Specification requires the contractor to submit documentation of the actual waste generated by each Department of Public Works

CONSTRUCTION AND DEMOLITION DEBRIS WASTE MANAGEMENT

DRAFT ORDINANCE

DIVERSION REQUIREMENTS FOR PROJECTS WITHIN THE CITY OF LOS ANGELES

(Proposed April 2005)

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

I DESCRIPTION

A. The Construction and Demolition (C&D) Waste Management Specification includes procedures for ensuring optimal diversion of construction and demolition waste generated by the project, and documentation procedures for tracking waste generation and diversion.

B. Each construction and/or demolition project shall reuse or recycle a minimum of 75% of the inert debris and 50% of the remaining construction and demolition debris generated by the project.

C. The project shall promote the City's sustainable building efforts by creating a resource-efficient and environmentally sensitive project and maintaining optimum control of the construction and demolition waste generated during the project.

D. The project shall use products with post-consumer recycled content to the greatest extent feasible. Refer to the California Integrated Waste Management Board's web site for information about recycled content construction products. Construction products must be approved by the Department of Building and Safety.

II DEFINITIONS

A. **Certified Mixed Debris Processing Facility** A solid waste processing facility that accepts loads of mixed debris for the purpose of recovering re-usable and recyclable materials and disposing of the non-recyclable residual material. A certified mixed debris processing facility has been certified by the City of Los Angeles to have a facility specific recycling rate for C&D waste and/or another facility specific recycling rate for municipal solid waste. Check Section VI-G for information on the current list of certified processors.

B. **Class III Landfill** A landfill that accepts non-hazardous solid waste such as household, commercial, and industrial solid waste. A Class III landfill must have a solid waste facilities permit from the California Integrated Waste Management Board (CIWMB) and is regulated by the Local Enforcement Agency (LEA).

C. **Construction and Demolition Debris (C&D Debris)** shall mean solid waste and recyclable materials that result directly from construction, remodeling, repair, demolition, or

DRAFT

deconstruction of buildings and other structures, do not contain hazardous waste (as defined in California Code of Regulations, Title 22, Section 66621.3, *et seq.*), and contain no more than one percent (1%) putrescible wastes by volume, calculated on a monthly basis. This includes, but is not limited to: asphalt, concrete, Portland cement, brick, lumber, wallboard, roofing material, ceramic tile, pipe, glass, carpet and associated packaging.

D. **Deconstruction** The process of taking apart a structure with the primary goal of preserving the value of all useful building materials, so that they may be reused or recycled.

E. **Disposal** Acceptance of solid waste at a legally operating facility for the purpose of landfilling.

F. **Diversion** Activities that result in reducing the amount of waste disposed at a landfill. This can include source reduction activities, composting, recycling, and reuse.

G. **Inert Backfill Site** A location, other than inert fill or other disposal facility, to which inert waste is taken for the purpose of filling an excavation, shoring, or another soils engineering operation.

H. **Inert Fill** A facility that can legally accept inert waste such as asphalt and concrete exclusively for the purpose of disposal.

I. **Inert Debris/Inert Waste** Solid waste and recyclable materials that are source separated or separated for reuse, do not contain hazardous waste (as defined in CCR, Title 22, section 66261.3 et. seq.) or soluble pollutants at concentrations in excess of applicable water quality objectives, and do not contain significant quantities of decomposable waste. Inert debris may not contain more than 1% putrescible wastes by volume calculated on a monthly basis. Gravel, rock, soil, sand and similar materials, whether processed or not, that have never been used in connection with any structure, development, or other human purpose are not inert debris.

J. **Mixed Debris** Material that includes commingled recyclable and non-recyclable construction and demolition debris.

K. **Mixed Debris Processing Facility** A solid waste processing facility that accepts loads of mixed debris for the purpose of recovering reusable and recyclable materials and disposing of the non-recyclable residual materials. See also Certified Mixed Debris Processing Facility.

L. **Permitted Waste Hauler** A company that possesses a valid and current permit from the City of Los Angeles to collect and transport solid waste from individuals or businesses in the City of Los Angeles.

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M. **Recycling** The process of sorting, cleaning, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating, or thermally destroying solid waste.

1. On-site Recycling Materials that are sorted and processed for use in an altered form in the project, (e.g. concrete is crushed for use as base for a parking lot on the site)
2. Off-site Recycling Source separated materials hauled to another location and used in an altered form in the manufacture of a new product.

N. **Recycling Facility** An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a Solid Waste Facilities permit from the CIWMB or be regulated by the LEA.

O. **Reuse** Materials that are recovered for use in the same form. This includes materials that are reused on-site or off-site.

P. **Salvage** Materials recovered for reuse or sale or donation to a third party.

Q. **Source Reduction** Any action causing a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of nonrecyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, and reducing the amount of yard waste generated.

R. **Source-Separated Materials (Construction and Demolition Debris)** Material that is sorted at the site of generation by individual material type for the purpose of reuse or recycling, i.e., loads of concrete that are source separated for delivery to a base course recycling facility. Note: The contractor may be able to save money on collection fees for source-separated material. Source-separated material is not subject to the City's 10% AB939 fee.

S. **Solid Waste** shall mean waste that the CIWMB has deemed acceptable for disposal at a Class III Landfill and shall not include source separated material.

T. **Transfer Station** A facility that can legally accept solid waste for the purpose of temporarily storing the materials for reloading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for reuse or recycling. Transfer stations must be permitted by the CIWMB and regulated by the LEA.

III DIVERSION REQUIREMENTS

A. The construction and demolition project shall reuse or recycle a minimum of 75% of the inert debris and 50% of the remaining construction and demolition debris generated by the project.

IV SUBMITTALS

A. **Waste Management Plan (WMP)** The contractor shall conduct a site assessment and estimate the types and quantities of materials, under the project, that are anticipated for on-site or off-site processing, recycling, reuse or disposal. Refer to the most recent issue of "Construction and Demolition Recycling Guide", see Section VI G, for a partial list of facilities that accept these materials for recycling.

1. After the contract is awarded and prior to the commencement of the project, the City project manager shall schedule and attend a meeting with the contractor to discuss the contractor's proposed WMP. This plan shall be submitted to allow the City and the contractor an opportunity to develop a mutual understanding regarding the recycling and reuse requirements and programs.

2. Not more than 20 working days after the meeting, and before the commencement of the project, the contractor shall prepare and submit to the City project manager a written WMP, Attachment A. The plan shall show a minimum 75% recycling for inert debris expected from the project and 50% recycling for the remaining c&d debris expected from the project. The contractor shall submit the plan in the format provided herein as Attachment A, Parts I and II. Instructions for filling out the form are in Attachment A, 'Instruction Sheet'. Work may not begin until the project Engineer approves the WMP for the project.

3. If the contractor expects a circumstances that the contractor believes make it infeasible to comply with the Diversion Requirement, the contractor may submit a written request for an exemption at the time the Waste Management Plan is submitted. If the exemption request is not approved by the Engineer, the contractor shall revise and resubmit a Waste Management Plan.

4. If the City determines that it is infeasible for the contractor to meet the Diversion Requirement due to unique circumstances, the City shall determine the maximum feasible diversion rate for each material and shall indicate this rate on the WMP submitted by the

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contractor. The City shall return a copy of the WMP to the contractor marked "Approved for Infeasible Exemption" as detailed in Section IV-B. The Contractor will be required to meet the maximum feasible diversion rates as approved by the City. If the Contractor fails to meet the revised rates the Contractor will be subject to penalties as stipulated in Section V.

Exempt projects are required to keep and submit all documentation for the project. This includes receipts, the WMP, Solid Waste Disposal and diversion Reports, and all supporting documentation as required herein.

5. The City's approval of the contractor's WMP will not otherwise relieve the contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures

B. **Solid Waste Diversion and Disposal Report (SWDD Report)** With each submittal of the contractor's application for progress payment, the contractor shall prepare and submit to the inspector a written Solid Waste Diversion and Disposal (SWDD) Report quantifying all material generated in the project which was either disposed, or diverted from disposal through reuse or recycling during the time period covered by the SWDD Report and progress payment. Part III of each SWDD Report is a cumulative history of the diversion and disposal for the project. The contractor shall submit the report in the format provided herein as shown in Attachment B. Failure to submit the report and the supporting documentation may render the application for progress payment incomplete and delay payment until the proper documentation is submitted. The supporting documentation includes manifests, weight tickets, receipts, reports, invoices, and other requires supporting documents specifically identifying the projects, the recyclables and solid waste generated by the project, and where the material was sent. Instructions for filling out the forms are in Attachment B, 'Instruction Sheet'. The final SWDD Report shall cover the complete time period of the project and shall contain, in Part III, a list of the total waste disposed and/or diverted for each reporting period. The final SWDD and supporting documentation must be submitted within 30day of the end of the project.

C. **Substitutions** Should the contractor desire to use materials, equipment, or products that meet the requirements of these specifications but are more environmentally sensitive, the contractor shall submit these substitutions in accordance with SUBSTITUTIONS and "OR EQUAL" SUBMITTAL of the General Requirements.

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V. PAYMENT RETENTION AND PENALTY

A. If the diversion requirement has not been met, a per ton penalty will be applied to the disposed material over that allowed in the approved WMP.

B. The penalty will be calculated as follows: Tons over that allowed in the approved WMP times the per ton penalty in effect at the time the contract was awarded. The penalty may not exceed the total payment retention for the project.

C. The penalty is $100 per ton.

D. The recommended penalty will be determined by the Bureau of Contract Administration and shall be considered by the Board of Public Works at the time of the project closeout.

E. The Contractor who has been assessed a penalty may submit a written request for a hearing. Upon receipt of the written request the awarding authority shall set the matter for hearing and notify the Contractor.

VI REUSE, SALVAGE, AND RECYCLING OPTIONS

A. Construction projects shall make use of as many reuse and salvage options as is feasible. One option is the California Materials Exchange (CalMAX), a free program sponsored by the CIWMB. The most recent issues of "Construction and Demolition Recycling Guide", see Section VI G, contains contact information for non-profit organizations, salvage facilities and other reuse organizations.

B. Recycling shall include both on-site and off-site recycling of source-separated materials, as well as mixed debris recycling efforts.

C. On-site recycling program shall produce a quality product to meet the specifications identified in the contract documents, subject to approval. The contractor shall estimate the amount of material to be used in the project and include a program for off-site recycling of any excess material that cannot be used in the project.

D. The contractor shall develop and implement a program to include source separation of solid waste, to the greatest extent feasible, of the following types:

1. Asphalt
2. Concrete, concrete block, slump stone (decorative concrete block)
3. Rock
4. Wood (lumber)
5. Green material (i.e. tree trimmings)

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6. Other materials, as appropriate, such as red clay brick, building fixtures, architectural details, dry wall, carpet, carpet padding, and corrugated cardboard

E. **Mixed debris recycling** The contractor should develop and implement a program to transport loads of commingled construction and demolition materials that cannot be feasibly source separated to a mixed debris recycling facility. A list of these facilities and their recycling rates is in the most recent issue of the "Construction and Demolition Recycling Guide" or on the web site, see Section VI G.

F. **Certified Processors.** These facilities have facility recycling rates, established by the City of Los Angeles for each mixed debris waste stream. Mixed construction and demolition debris taken to these facilities are considered to have been recycled at the rate of the certified processing facility. For example, 100 tons of material taken to a facility with a recycling rate of 60% gives the project credit for 60 tons of recycling. A list of these facilities and their recycling rates is in the most recent issue of the "Construction and Demolition Recycling Guide" or on the web site, see Section VI G.

G. **Recycling, Reuse, Mixed Waste Processing and Salvage Facilities** The "Construction and Demolition Recycling Guide", published by the Bureau of Sanitation's Solid Resources Citywide Recycling Division, is incorporated herein by reference and contains information about processing, recycling, reuse and salvage facilities. For the most recent version visit the CITY'S web site, WWW.LACITY//ORG//SAN//SRCRD, or contact Solid Resources Citywide Recycling Division, 433 South Spring Street, 5th Floor, Los Angeles, CA 90013, (213) 473-8228; FAX (213) 473-8232.

G. **Revenue** Revenue or savings obtained from recycled, reused, or salvaged materials shall accrue to the contractor unless otherwise noted in the contract documents. Note: The contractor may be able to save money on collection fees for source separated material. Source-separated material is not subject to the City's 10% AB939 fee. Permitted waste haulers that take mixed c&d debris to certified processors may be eligible for a rebate on part of the AB 939 fee.

H. **AB 939 Fee** The AB 939 fee is assessed on all solid waste hauled within the City of Los Angeles in accordance with Section 66.32 of the Los Angeles Municipal Code.

1. All solid waste haulers hauling material from City of Los Angeles locations must be permitted in accordance with Section 66.32 of the Los Angeles Municipal Code.

2. Source-separated material is not assessed this fee.

3. Permitted solid waste haulers may apply for a rebate for the recycled portion of the mixed waste taken to certified mixed debris processing facilities.

VII HAULING AND DISPOSAL OPERATIONS

A. **Hauling** The contractor is responsible for arranging the collection and hauling of C&D debris by a waste hauler that is permitted by the City of Los Angeles in accordance with Section 66.32 of the Los Angeles Municipal Code.

B. **Recycling And Processing Facilities** The contractor shall be responsible for transporting C&D debris to recycling or processing facilities. The contractor shall be familiar with the requirements for acceptance of C&D materials at the recycling and processing facilities before the material is delivered. The most recent issue of "Construction and Demolition Recycling Guide", see Section VI F, includes a partial list of these facilities. Always call facilities in advance.

C. **Disposal Facilities** The contractor shall be responsible for transporting C&D debris that cannot be delivered to a recycling or processing facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.

D. The contractor may not burn, bury, or otherwise dispose of solid waste on the project job-site.

Attachment A

WASTE MANAGEMENT PLAN
INSTRUCTION SHEET

1. **Please print very clearly or type.**
2. Attachment A includes: **Part I**-Inert Materials and **Part II**-All Other Materials
3. The information required includes but is not limited to, the following:
   a. Contractor and project identification information
   b. Methods to be used for recycling, reusing, salvaging and disposing of materials. The method number should be chosen from the list at the top of Part I and Part II.
   c. Estimated quantities of **all** materials listed, in tons.
4. **Calculating recycling and disposal for mixed material taken to a certified processor: the total tons to be taken to certified processor times the recycling rate = amount to be recycled. Total to be taken to facility minus amount to be recycled = amount for disposal.
5. **Sample**

Project Title: Big St. Overcrossing	W. O. Number: 12341-0230709	Date Submitted: 09/09/99

Contractors Name: Acme Construction
Street address: 33333 Some St.
City, State, Zip: Anytown Ca. 90000
Phone: 213-555-5555 Fax: 213-555-1111 Email:

Methods

1) Hand - wrecking to recover salvageable materials to be used on - site
2) Hand - wrecking to recover salvageable materials to be taken off - site
3) Other (please describe)
4) Source separating materials and hauling to recyclers
5) Hauling to a landfill or transfer station
6) Hauling inerts to an engineered fill

Material	Facility and Location	Method	Tons Recycled	Tons Disposed
	RECYCLING			
Asphalt	BBB Crushing	4	200	
Concrete	BBB Crushing	4	55	
Brick	Joe's Salvage	2	6	
Other(Describe) Clean Gravel	The Best Landscaping	4	600	
	DISPOSAL			
Mixed waste	Joe's Landfill			1000
Other				
	CERTIFIED PROCESSING**			
Mixed Waste	Ben's Processing (Recycling Rate .81		8100	1900
Mixed Waste				
	RECYCLING AND DISPOSAL TOTALS =		8961	2900

Percent Recycling = $\frac{\text{Total recycled}}{\text{Total recycled + Total disposed}}$ X 100 =

Percent Recycling = 8961

$$\frac{8961 + 2900}{} \times 100 = 75.5\%$$

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Attachment A

WASTE MANAGEMENT PLAN (Part I-Inert Materials)

Project Title:	W. O. Number:	Date Submitted:

Company Name: Daytime Phone Number:

Index Number: Department:

Methods

1) Hand-wrecking to recover salvageable materials to be used on - site
2) Hand-wrecking to recover salvageable materials to be taken off - site
3) Other (please describe)
4) Hauling inerts to an engineered fill
5) On-site concrete and asphalt crushing for use on - site
6) On-site concrete and asphalt crushing for use off - site
7) Source separating materials and hauling to recyclers

Material	Facility and Location	Method	Tons Recycled	Tons Disposed
RECYCLING				
Asphalt				
Concrete				
Brick				
Other (Describe)				
Other (Describe)				
DISPOSAL				
Mixed inerts				
Other (Describe)				
Other (Describe)				
Other (Describe)				
CERTIFIED PROCESSING**				
Mixed inerts				
Mixed inerts				
Mixed inerts				
Mixed inerts				
RECYCLING AND DISPOSAL TOTALS			=	

$$\text{Percent Recycling} = \frac{\text{Total recycled}}{\text{Total recycled} + \text{Total disposed}} \times 100 =$$

$$\text{Percent Recycling} = \frac{\quad}{\quad + \quad} \times 100 =$$

**Recycling tonnages for debris taken to a certified processor = total tonnage taken to facility X recycling rate. Remaining tonnage counts as disposal. Example: 200 tons taken to a certified processor with a recycling rate of 0.63 (63%) yields 126 tons of recycling and 74 tons of diversion.

Attachment A

WASTE MANAGEMENT PLAN (Part II-All Other Materials)

W. O. No.:	Date Submitted:

Methods

1) Hand - wrecking to recover salvageable materials for re-use on - site
2) Other (please describe)
3) Hand - wrecking to recover salvageable materials to be taken off - site
4) Source separating materials and hauling to recyclers

Material	Facility and Location	Method	Tons Recycled	Tons Disposed
RECYCLING				
Glass				
Wood / Greenwaste				
Metal				
Cardboard				
Other (Describe)				
Other (Describe)				
DISPOSAL				
Mixed Waste				
Other (Describe)				
Other (Describe)				
CERTIFIED PROCESSING**				
Mixed Waste				
Mixed Waste				
Mixed Waste				
Mixed Waste				
RECYCLING AND DISPOSAL TOTALS =				

Percent Recycling = $\frac{\text{Total recycled}}{\text{Total recycled} + \text{Total disposed}}$ X 100 =

Percent Recycling = $\frac{\quad}{\quad}$ X 100 =

Name & title of person responsible for the information in this form:	Signature:

**Recycling tonnages for debris taken to a certified processor = total tonnage taken to facility X recycling rate. Remaining tonnage counts as disposal. Example: 200 tons taken to a certified processor with a recycling rate of 0.63 (63%) yields 126 tons of recycling and 74 tons of disposal.

ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
INSTRUCTION SHEET

See Section VI F, for information about recycling construction and demolition materials.

Please print very clearly or type.

With each submittal of contractor's application for progress payment, the contractor shall prepare and submit to the inspector a written Solid Waste Diversion and Disposal Report quantifying all material generated in the project that was either disposed in landfills or diverted from disposal through recycling or reuse.

Submit the report in the format provided as Attachment B. The report contains three sections. All three sections must be submitted each time.

A. **Instructions for PART I only** This section is to be used to report the disposal and diversion of inert waste material for the period covered by the report and progress payment request

   1. Indicate the Project title; City Work Order Number; Date report was submitted; Progress Payment Number; the name of the company completing the 'Solid Waste Diversion and Disposal Report' and compiling supporting documentation; daytime phone number of the person responsible for the information on the form; the Index Number; the City Department for which the work in being done; and the beginning and ending dates of the period covered by this report and the progress payment request.

B. **Instructions for PART II only** This section is to be used to report the disposal and diversion of all other construction and demolition waste material for the period covered by the report and progress payment request

   1. Indicate the City Work Order Number and Date report was submitted.

C. **Instructions for PART I and PART II**

   1. For each waste material type generated during the reporting period, list all facilities to which the material was taken, the location of the facility, and how much material went to each facility.
   2. If there is no quantity to report for a type of material during the report period, indicate zero (0) in the tons recycled column
   3. These facilities can include:
      a. Mixed Debris Recycling Facilities
      b. Source Separated Recycling Facilities
      c. Class III Landfills
      d. Inert Backfill Sites
      e. Salvage yards
   4. The Solid Waste Diversion and Disposal Report must be accompanied by legible copies of weigh tickets, receipts, or invoices that specifically identify the project generating the material. Said documents must be from recyclers and/or disposal site operators that can legally accept the materials and must be for the same weights reported
   5. If materials are taken to a facility for which weigh tickets, receipts, or invoices are not available, contractor shall provide documentation *on company letterhead* identifying the address to which materials were taken, name of owner/operator, type of materials, tons disposed, and the specific project generating the materials.
   6. If materials are used on site, contractor shall provide documentation *on company letterhead*

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identifying the type and tons of materials being reused or recycled on site and the specific project generating the materials.

ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
INSTRUCTION SHEET

7. Indicate on each sheet the total tons of material that was recycled and the total tons of material that was disposed during the reporting period.

D. Instructions for PART III only This is a cumulative report of the entire project up through the reporting period ending date listed in Part I. This part of the report is used to calculate the total disposal and recycling to date for both the inert material and all other waste material for this project. It is also used to calculate the current recycling rate for the inert material and for the other c&d waste material generated by this project.

1. Indicate the City Work Order Number and Date report was submitted.
2. Each Attachment B Part I and Part II that has been submitted for this project is represented by one line in Part III.
3. The Period Beginning and Period Ending dates are copied from Part I
4. Period Disposal and Period Recycling are the totals copied from either Part I or Part II.
5. The Cumulative Project Disposal is all of the Period Disposals added together, and the Cumulative Project Recycling is all of the Period Recycling added together.
6. Cumulative Waste Generated is the last Cumulative Project Disposal added to the last Cumulative Project Recycling.
7. The current or Cumulative Recycling Rate (%) is Cumulative Project Recycling divided by the Cumulative Waste Generated times 100.
8. At the end of the project, the last line in each section of Part III will be the project totals and the project recycling rate.
9. The bottom of Part III must have the printed name, title, and signature of the person responsible for the information in the Diversion and Disposal Report.
10. SAMPLE:

W. O. Number: 12341-0230709				Date Submitted: 2-12-04			
Period Beginning	Period Ending	*Period Disposal	Cumulative Project Disposal	*Period Recycling	Cumulative Project Recycling	Cumulative Waste Generated= D + R	Cumulative Recycling %= (R/G)100
INERT WASTE MATERIAL CUMULATIVE PROJECT HISTORY							
1-15-04	1-29-04	9000	9000	3333	3333	12333	27.0
1-30-04	2-10-04	698	9698	1965	5298	14926	35
ALL OTHER WASTE MATERIAL CUMULATIVE PROJECT HISTORY							
1-15-04	1-29-04	0	0	0	0	0	------

1-30-04	2-10-04	300	300	1200	1200	1500	80.0

Name & title of person responsible for the information in this form:	Signature:

ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART I OF III - INERT WASTE MATERIAL

Project Title:	W. O. Number:	Date Submitted:	Progress Payment #

Company Name:	Daytime Phone Number:
Index Number:	Department:
Period Covered In This Report:	
From:	To:

Material	Facility and Location	Tons Recycled	Tons Disposed
RECYCLING			
Asphalt			
Concrete			
Brick			
Other (Describe)			
Other (Describe)			
DISPOSAL			
Mixed inerts			
Other (Describe)			
Other (Describe)			
Other (Describe)			
CERTIFIED PROCESSING**			
Mixed inerts			
Mixed inerts			
Mixed inerts			
Mixed inerts			
=	**RECYCLING AND DISPOSAL TOTALS ***		

*Copy the recycling and disposal totals to Part III Cumulative Project Recycling Report. Each Report needs to have the totals from every previous Disposal And Diversion Report listed on it, as well as the totals from this report.

**Recycling tonnages for debris taken to a certified processor = total tonnage taken to facility X recycling rate. Remaining tonnage counts as disposal. Example: 200 tons taken to a certified processor with a recycling rate of 0.63 (63%) yields 126 tons of recycling and 74 tons of disposal.

ATTACHMENT B

SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART II OF III - ALL OTHER WASTE MATERIAL

W. O. Number:		Date Submitted:	
Material	**Facility and Location**	**Tons Recycled**	**Tons Disposed**
	RECYCLING		
Metal			
Wood / Lumber			
Greenwaste / Landscaping			
Glass			
Cardboard			
Other (Describe)			
Other (Describe)			
	DISPOSAL		
Mixed waste			
Other (Describe)			
Other (Describe)			
Other (Describe)			
	CERTIFIED PROCESSING**		
Mixed waste			
Mixed waste			
Mixed waste			
Mixed waste			
=	**RECYCLING AND DISPOSAL TOTALS***		

*Copy the recycling and disposal totals to Part III Cumulative Project Recycling Report. Each Report needs to have the totals from every previous Disposal And Diversion Report listed on it, as well as the totals from this report.

**Recycling tonnages for debris taken to a certified processor = total tonnage taken to facility X recycling rate. Remaining tonnage counts as disposal. Example: 200 tons taken to a certified processor with a recycling rate of 0.63 (63%) yields 126 tons of recycling and 74 tons of disposal.

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ATTACHMENT B

SOLID WASTE DIVERSION AND DISPOSAL REPORT

PART III OF III - PROJECT CUMULATIVE TOTAL

W. O. Number:						Date Submitted:	
Period Beginning	Period Ending	*Period Disposal	Cumulative Project Disposal	*Period Recycling	Cumulative Project Recycling	Cumulative Waste Generated D + R	Cumulative Recycling % (R/G)100
INERT WASTE MATERIAL CUMULATIVE PROJECT HISTORY							
ALL OTHER WASTE MATERIAL CUMULATIVE PROJECT HISTORY							
Name & title of person responsible for the information in this form:						Signature:	

*From appropriate Part I or II for each period.

Each Attachment B Part III Report needs to have the diversion and disposal totals from every previous Disposal And Diversion Report listed in it, as well as the totals from this report.

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Attach and sign more Part III forms and continue information if more rows are needed.

APPENDIX I

DWP
RENEWABLE PORTFOLIO STANDARD (RPS) PROGRAM

LADWP Proposed Renewable Portfolio Standard

Fact Sheet

LADWP is developing a Renewable Portfolio Standard (RPS) designed to increase the amount of energy it generates from renewable power sources to 13 percent of its energy sales to retail customers by 2010 and to 20 percent by 2017. The policy will provide a long-term framework to achieve the 20 percent goal without compromising power reliability or the financial stability of the Department and its customers.

Background

An RPS is a goal to generate a certain percentage of the energy delivered to the customer from renewable resources by a certain date. An RPS improves air quality and provides a sustainable energy resource. In 2002, the state Legislature approved SB 1078 requiring investor owned utilities (IOUs such as PG&E, SCE, SDG&E) to provide 20% of their energy from renewable resources by 2017. SB 1078 does not apply directly to the municipally owned utilities; however it does require those utilities to develop their own RPS. On June 29, 2004, the City Council approved a resolution supporting the concept, or "roadmap" for achieving a 20% by 2017.

RPS Proposal

The LADWP RPS "roadmap" or proposal includes the following key elements:
• Issuing a Request for Proposal (RFP) to develop and/or purchase renewable energy resources. Proposed development and/or purchase opportunities would be evaluated based on "least cost, best fit" technologies.
• Soliciting feedback from key stakeholders, including elected officials, labor unions, the environmental community, the business community and Neighborhood Councils.
• Completing an independent review of the RPS plan and subjecting the RPS to an annual compliance audit.
• Establishing a renewable surcharge to recover anticipated additional costs of renewable energy.

RPS Goals

• Integrate renewables into LADWP's retail energy mix without compromising system reliability.
• Procure renewable energy resources for ownership and/or purchase, based on least-cost & best-fit technologies. Mitigate the financial impact on retail customers.
• Ensure LADWP's financial integrity is maintained.

• Continue to encourage voluntary contributions from customers to fund renewable resources.
• Support and build on the 2000 Integrated Resource Plan objectives: Reliable Service, Competitive Prices, and Environmental Leadership.

Eligible Renewable Resources

LADWP's proposed RPS includes the following types of renewable resources: hydroelectric, biomass, biodiesel, digester gas, waste gas, landfill gas, solar thermal, geothermal, photovoltaics, fuel cells with renewable fuels, ocean wave technologies wind, and other renewables.

Under the state legislation, only "small hydro" (30 megawatts or less) is an eligible renewable energy resource. However, to help mitigate the impact of the RPS on ratepayers, city officials may decide to include LADWP's four aqueduct hydro power plants, each of which has slightly more than 30 megawatts. If included in the RPS, these hydro facilities would add 1.8 percent renewables to LADWP's existing portfolio. In addition, LADWP has 491 megawatts of capacity in the Hoover Power Plant, representing another 2.8 percent in potential renewable energy. If Hoover were also included in the RPS, that would bring LADWP's current renewable generation to about 8 percent of its energy sales to retail customers.

Funding the RPS

For LADWP to develop a responsible and practical renewable energy policy, it must balance environmental objectives such as fuel diversity, energy efficiency and clean air against the Department's core responsibility to distribute safe, reliable and low-cost energy to its customers.

The financial impact of meeting the 20 percent RPS goal will vary depending on the mix of resource types and associated costs. Generally, renewable energy costs more than traditional energy sources such as natural gas and coal. However, a diversified energy portfolio, including a larger mix of renewables, would also reduce the risks of price spikes due to fuel supply shortages and price fluctuations.

LADWP proposes to recover the costs for renewables by establishing a renewables energy surcharge to cover interconnection costs, transmission costs, renewable energy costs that exceed the cost of providing power from traditional sources, and renewable power procurement and administrative costs. Elements of the proposal include:
• A cap on what LADWP would pay for renewable energy at 7.0 cents per kWh, escalated annually at a fixed rate of 1.5% to cover inflation.
• A cap on annual increases in the renewables surcharge to customers at $0.001 per kWh.
• A cap on the cumulative lifetime surcharge at $0.0061 per kWh.
• Deferral of the renewables surcharge for first 3 years (through June 30, 2007).

Renewable Portfolio Standard (RPS)
Frequently Asked Questions

What is an RPS?

A Renewable Portfolio Standard (RPS) is a goal to generate a certain percentage of the energy delivered to the customer from renewable resources by a certain date.

An RPS also defines what is considered as an eligible renewable resource. (e.g. solar, wind, geothermal, biomass, hydro, etc)
Renewable Portfolio Standards are actually not standard across the nation. States have adopted an RPS that meets their regional priorities and circumstances or have not yet adopted an RPS.

What Purpose Does an RPS Serve?

An RPS improves air quality and reduces dependence on fossil fuels. It also diversifies the energy resource mix and provides a sustainable energy resource.

However, other initiatives such as energy conservation and efficiency and the repowering of older units also improve air quality.

Is Renewable Energy Cost Effective?

Currently, renewable energy is not cost effective in comparison to our existing generating facilities (coal, natural gas, nuclear, hydro). However, as the cost of natural gas continues to increase, the relative cost of renewable energy becomes more attractive.

Wind energy and existing hydroelectric plants are among the most cost effective. Solar is among the most expensive. In addition to cost, another issue with renewable energy is that it isn't always readily available (i.e. the sun doesn't always shine and the wind doesn't always blow).

What is the State RPS?

SB 1078, which was approved in 2002, requires the IOUs (e.g. PG&E, SCE, SDG&E) to provide 20% of their energy from renewable resources by 2017. There has been discussion regarding moving that date up to 2010.

SB 1078 has various restrictions regarding what qualifies as a renewable resource. For

example, the State does not consider large hydropower and municipal waste generators as a renewable resource.
SB 1078 does not apply directly to the municipally owned utilities, however it does require those utilities to develop their own RPS.

Why isn't the city included in the state RPS?

There have been numerous attempts by members of the State legislature and various environmental groups to mandate all the municipally owned utilities, particularly LADWP, to comply with the State RPS.

The City has lobbied to avoid being included in a State mandated RPS for two reasons: 1) to maintain the local control of the Council and Mayor over LADWP; and 2) to be able to design its own RPS to meet it own regional needs (e.g. impact to local jobs and economy).

Local control is a major concern of the City and LADWP because it was through maintaining local control that LADWP was able to avoid the State's failed attempt at deregulation which resulted in rolling blackouts and significant rate increases.

What is LADWP's Proposed RPS?

On June 29, 2004, the City Council approved of a resolution to adopt a 20% by 2017 RPS for LADWP. At that Council meeting LADWP presented a "roadmap" or proposed RPS which contains:
• An interim goal of 13% by 2010;
• A price limit on how much LADWP will spend on renewable energy set at 7 cents/kwh (kilowatt-hour);
• A rate impact to an average residential customer of approximately $3.00 per month in 2017;
• Issuance of an RFP to procure renewable energy;
• LADWP's proposal also committed to soliciting feedback from the key stakeholders, including the Mayor's Green Ribbon Commission; City Officials; Labor Unions; Environmental Community; Business Community; and Neighborhood Councils.
• Note that LADWP currently has a Mayor and Council approved Integrated Resource Plan adopted in 2000 which contains a commitment that LADWP shall meet half of its future load growth through renewable energy and energy efficiency. It appears that the proposed policy would supercede that goal.

I am currently a Green Power customer. How will the proposed RPS surcharge affect what I now pay for Green Power?

The RPS surcharge, if approved and implemented, would be paid by all DWP customers

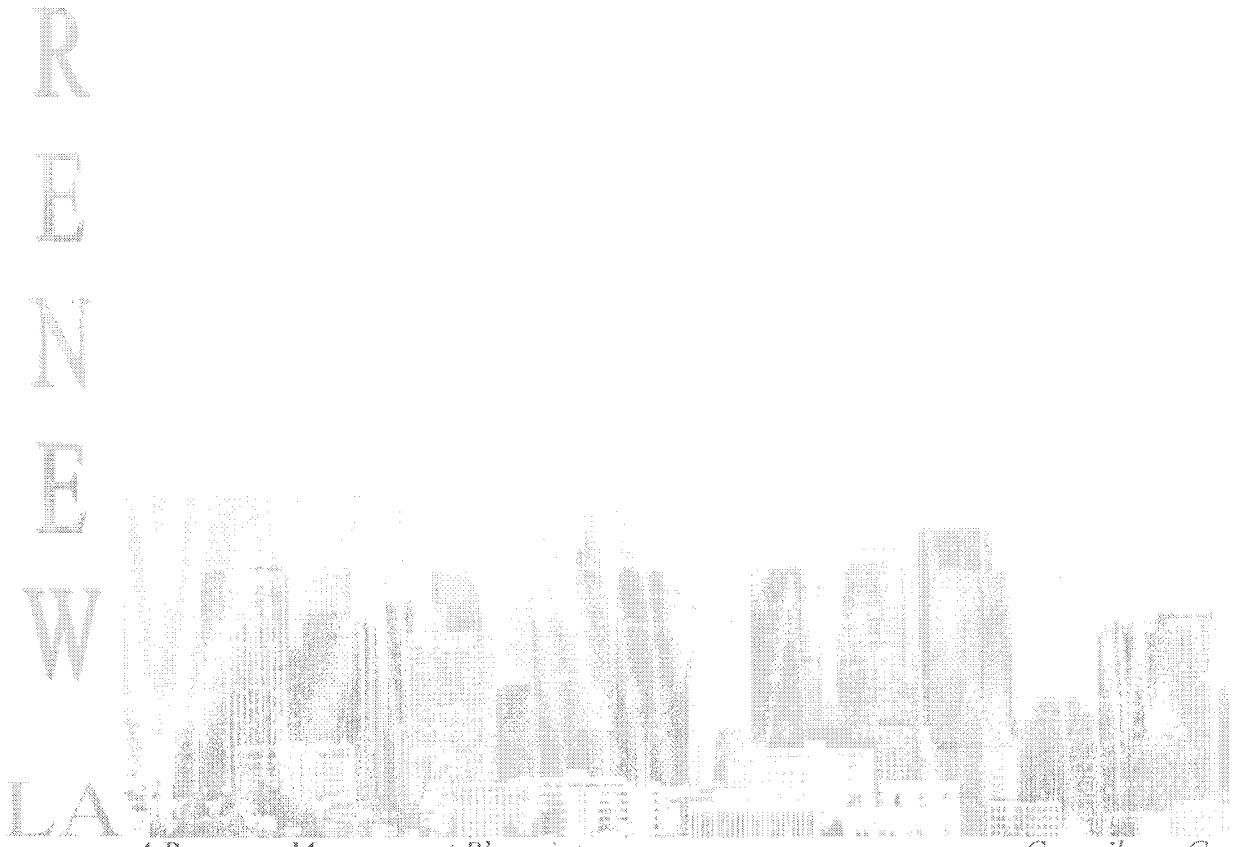
to support meeting the RPS goals. On the other hand, the Green Power program is a separate voluntary program in which customers chose to pay a premium to support additional renewable energy beyond RPS requirements.

What is the difference between the Green Power program and the RPS, and will the Green Power Program continue?

The Green Power program will complement the RPS such that Green Power customers will continue to separately receive their specified percentage of renewable energy in addition to any renewable energy that is part of the RPS.

APPENDIX J

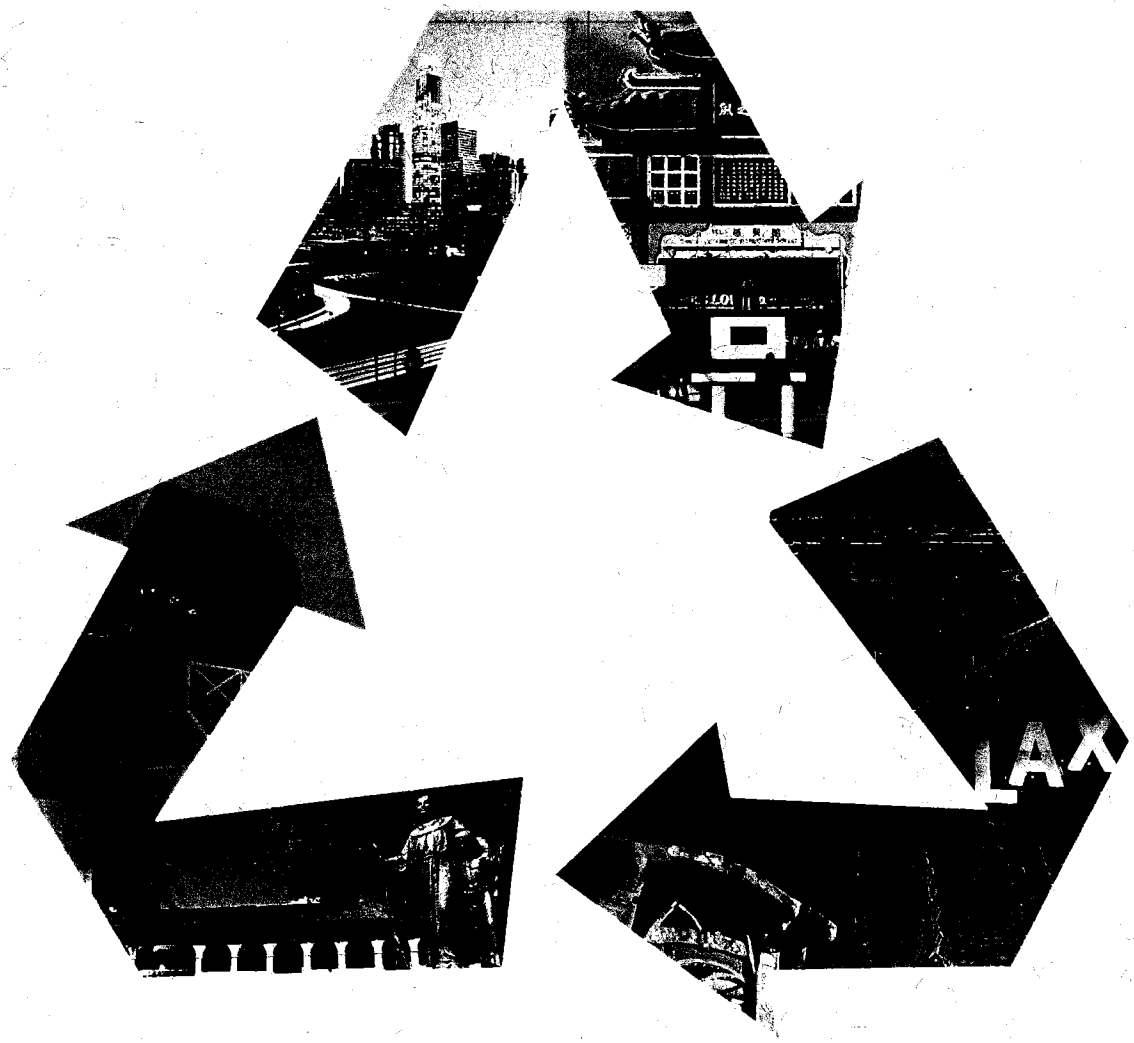
EXECUTIVE SUMMARY
"City of Los Angeles Recycling Economic Information Study"



A Resource Management Blueprint

Councilman Greig Smith • June 2005

# of Los Angeles
ng Economic Information Study



Department of Public Works

Bureau of Sanitation

Solid Resources Citywide Recycling Division

April 2002

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Overview

This report presents the results of the Los Angeles Recycling Economic Information (REI) Study that was commissioned by the City of Los Angeles. This study was conducted by R. W. Beck, Inc., under subcontract to SCS Engineers, with economic modeling provided by Iowa State University. This Executive Summary contains the results of the study. The remainder of the report is dedicated to a complete and thorough documentation of the results and the methodology used in producing them.

The methodology used for this study conforms to the methodology developed by the Northeast Recycling Council for gathering economic data on the recycling and reuse industry.[1] Recycling establishments that use a combination of recycled and virgin feedstock in making their products were defined to be recycling and reuse industry establishments for the purposes of this project.[2]

The goal of the study was to document the size of the recycling and reuse industry by first determining direct economic information for each of twenty-six categories of recycling and reuse establishments. The direct economic values that were measured included:

- Number of establishments;
- Employment;
- Annual payroll;
- Annual receipts; and
- Annual throughput (for recycling categories).

Next, similar information was estimated for four categories of supporting establishments intimately involved in the recycling and reuse industry. Finally, the broader effect of recycling and reuse businesses and their employees on the economy was derived through economic modeling using direct data as inputs. This information included:

- Indirect economic values (inter-industry linkages as measured by purchase of intermediate commodities);
- Induced economic values (personal spending by employees of direct and indirect establishments);
- Multipliers to calculate total economic values (the sum of direct, indirect, and induced) from direct economic values; and
- Tax revenues attributable to the recycling and reuse industry.

[1] Northeast Recycling Council, *Recycling Economic Information Study*, June 2000.

[2] In general, entire-establishment economic data were counted. However, economic data were adjusted to eliminate virgin-only establishment data, remove the economic activity associated with virgin-material preparation at mixed virgin and recycled feedstock establishments, and remove the economic activity of manufacturing steps that are unrelated to recycling (e.g., converting intermediate products to finished goods).

Size of the Recycling and Reuse Industry

The City of Los Angeles' recycling and reuse industry is highly diverse in terms of which recovered materials are utilized, average establishment size, and which technologies are employed. Its recycling sector includes long-established sub-industries such as paper making, as well as new entrepreneurial ventures such as composting and recycled rubber product manufacturing. The reuse and re-manufacturing sector encompasses a diverse mix of establishments including wood reuse (e.g., pallet rebuilders), tire retreaders, and retailers of used merchandise. This size and diversity of Los Angeles's recycling and reuse industry can be seen in Table ES-1, which presents estimates for twenty-six categories of establishments.

TABLE ES-1
Summary of Estimates of Direct Economic Activity

Annual Payroll and Estimated Receipts are in $1,000. Throughput is in Thousands of Tons. [3]

(D) – Disclosure issue. Data is not shown for survey categories with 2 or less establishments to avoid disclosing sensitive information. Data for these categories is included in the Industry Subtotals and Grand Totals.

Business Category	Data Type	Estimates of Total Recycling and Reuse-Related Economic Activity
Recycling Industry Economic Activity		
1. Government Staffed Collection	Establishments	1
	Employment	268
	Annual Payroll	19,656
	Estimated Receipts	97,240
	Estimated Throughput	624
2. Private Staffed Collection	Establishments	25
	Employment	60
	Annual Payroll	2,076
	Estimated Receipts	4,650
	Estimated Throughput	31
3. Compost and Miscellaneous Organics Producers	Establishments	10
	Employment	235
	Annual Payroll	10,015
	Estimated Receipts	48,182
	Estimated Throughput	697
4. Materials Recovery Facilities (MRFs)	Establishments	5
	Employment	925
	Annual Payroll	13,834
	Estimated Receipts	58,750
	Estimated Throughput	188
5. Recyclable Material Wholesalers	Establishments	135
	Employment	2,045
	Annual Payroll	54,018
	Estimated Receipts	872,251
	Estimated Throughput	3,168

[3] Throughput is amount of recovered material recycled and includes manufacturing scrap sent for recycling. It excludes materials prepared for fuel use and in-house process scrap returned to the manufacturing process. Throughput estimates are not summed to avoid triple counting at collection, processing, and manufacturing stages.

Business Category	Data Type	Estimates of Total Recycling and Reuse-Related Economic Activity
Recycling Industry Economic Activity		
6. Glass Container Manufacturing Plants	Establishments	2
	Employment	(D)
	Annual Payroll	(D)
	Estimated Receipts	(D)
	Estimated Throughput	18
7. Glass Product Producers (other recycled uses)	Establishments	1
	Employment	(D)
	Annual Payroll	(D)
	Estimated Receipts	(D)
	Estimated Throughput	18
8. Nonferrous Secondary Smelting and Refining Mills	Establishments	1
	Employment	(D)
	Annual Payroll	(D)
	Estimated Receipts	(D)
	Estimated Throughput	1
9. Nonferrous Product Producers	Establishments	2
	Employment	(D)
	Annual Payroll	(D)
	Estimated Receipts	(D)
	Estimated Throughput	1
10. Nonferrous Foundries	Establishments	25
	Employment	487
	Annual Payroll	14,423
	Estimated Receipts	49,433
	Estimated Throughput	3
11. Paper, Paperboard, and Deinked Market Pulp Mills	Establishments	4
	Employment	513
	Annual Payroll	19.902
	Estimated Receipts	158,004
	Estimated Throughput	57
12. Paper-Based Product Manufacturers	Establishments	3
	Employment	42
	Annual Payroll	1,269
	Estimated Receipts	10,500
	Estimated Throughput	16
13. Pavement Mix Producers (asphalt and aggregate)	Establishments	0
	Employment	0
	Annual Payroll	0
	Estimated Receipts	0
	Estimated Throughput	0
14. Plastics Reclaimers	Establishments	7
	Employment	90
	Annual Payroll	2,621
	Estimated Receipts	7,582
	Estimated Throughput	14
15. Plastics Converters	Establishments	36
	Employment	762
	Annual Payroll	19,679
	Estimated Receipts	224,900
	Estimated Throughput	30
16. Rubber Product Manufacturers	Establishments	6
	Employment	62
	Annual Payroll	965
	Estimated Receipts	10,180
	Estimated Throughput	4

Business Category	Data Type	Estimates of Total Recycling and Reuse-Related Economic Activity
Recycling Industry Economic Activity		
17. Steel Mills	Establishments	0
	Employment	0
	Annual Payroll	0
	Estimated Receipts	0
	Estimated Throughput	0
18. Iron and Steel Foundries	Establishments	0
	Employment	0
	Annual Payroll	0
	Estimated Receipts	0
	Estimated Throughput	0
19. Other Recycling Processors/Manufacturers	Establishments	5
	Employment	30
	Annual Payroll	780
	Estimated Receipts	1,755
	Estimated Throughput	41
Recycling Industry Subtotals	**Establishments**	268
	Employment	5,762
	Annual Payroll	165,208
	Estimated Receipts	1,579,613

Reuse and Remanufacturing Industry Economic Activity		
20. Computer and Electronic Appliance Demanufacturers	Establishments	0
	Employment	0
	Annual Payroll	0
	Estimated Receipts	0
	Estimated Throughput	N/A
21. Motor Vehicle Parts (used)	Establishments	120
	Employment	816
	Annual Payroll	16,698
	Estimated Receipts	100,908
	Estimated Throughput	N/A
22. Retail Used Merchandise Sales	Establishments	181
	Employment	985
	Annual Payroll	18,160
	Estimated Receipts	107,282
	Estimated Throughput	N/A
23. Tire Retreaders	Establishments	10
	Employment	41
	Annual Payroll	1,036
	Estimated Receipts	5,780
	Estimated Throughput	N/A
24. Wood Reuse	Establishments	16
	Employment	249
	Annual Payroll	5,068
	Estimated Receipts	37,514
	Estimated Throughput	N/A
25. Materials Exchange Services	Establishments	0
	Employment	0
	Annual Payroll	0
	Estimated Receipts	0
	Estimated Throughput	0

Business Category	Data Type	Estimates of Total Recycling and Reuse-Related Economic Activity
Recycling Industry Economic Activity		
26. Other Reuse	Establishments	6
	Employment	41
	Annual Payroll	886
	Estimated Receipts	2,277
	Estimated Throughput	N/A
Reuse Industry Subtotals	**Establishments**	333
	Employment	2,132
	Annual Payroll	41,848
	Estimated Receipts	253,761

GRAND TOTALS Recycling and Reuse/Remanufacturing	**Establishments**	601
	Employment	7,894
	Annual Payroll	207,056
	Estimated Receipts	1,833,374

As Table ES-1 shows, Los Angeles hosts 601 recycling and reuse establishments that employ approximately 7,900 people, generate an annual payroll of $207 million, and gross $1.8 billion in annual revenues.

Insight into Los Angeles's recycling and reuse industry can be obtained by comparing the relative sizes of individual business categories and groups of categories that are related in terms of materials recycled or the industry sector in which they belong.

Comparison of the Recycling Sectors to the Reuse Sector

A noticeable distinction exists between the recycling sector and the reuse sector in terms of the size of establishments and average annual payroll. The recycling establishments have an average of 22 employees each, with an average annual payroll per employee of $28,700. Comparatively, the reuse sector is made up of smaller establishments – an average of 6 employees per establishment – with an average annual payroll of $19,600 per employee. Although the reuse and remanufacturing sector accounts for 55 percent of total establishments, it makes up only 27 percent of total employees, 20 percent of payroll, and 14 percent of receipts.[4]

It is assumed that differences in employee pay between recycling sector and reuse sector establishments closely follow the level of skill and training required of employees. Recycling manufacturing, which contributes heavily to the overall recycling statistics, generally requires employees of higher skill and training than is normally required of employees of reuse establishments. Employees of higher skill and training are paid more than employees of lesser skill and training. It should be

[4] These reuse and remanufacturing figures are thought to represent the minimum amount of economic activity captured by the methodology because remanufacturing activities are often included with traditional manufacturing industries that were not included in this study. Several years ago Boston University estimated remanufacturing activities on the national level (Professor Robert T. Lund, *The Remanufacturing Industry: Hidden Giant,* 1996). That study suggested that reuse and remanufacturing categories may be as much as three times larger than that characterized by this study's methodology.

noted that remanufacturing jobs, which were not well-characterized by this study, are more likely to have similar skill and training requirements to recycling manufacturing jobs and would pay higher wages than the average reuse sector job.

The difference in average employees per establishment between the recycling and reuse sectors can come from several sources, although two are most likely: (1) whether continuous production processes are employed; and (2) whether economies of scale produce improved production efficiency. Continuous production processes are normally employed to save energy, avoid production startup/shutdown inefficiencies, or cover high monthly fixed costs (such as capital equipment finance costs) by increasing daily production and revenues. Establishments that operate three shifts per day employ more persons than establishments of similar hourly production capacity that operate one shift per day. Processes where economies of scale reduce unit costs apply to those instances where overhead costs are significantly streamlined or where larger-sized capital equipment is more efficient than smaller-sized equipment. Because the capital equipment and processes employed in recycling manufacturing favor continuous production and economies of scale, it is not unexpected that recycling establishments are on average larger than reuse sector establishments (which rely more heavily on manual labor).

Comparison of Recycling Collection and Processing to Recycling Manufacturing

Recycling categories that are focused locally on recovering materials from commercial, industrial, and residential waste streams include establishments that collect and process recyclables for shipment to the recycling manufacturing industry. These local recycling collection and processing establishments include:

- Government staffed residential curbside collection;
- Privately-staffed residential curbside collection;
- Compost and miscellaneous organics products producers;
- Materials recovery facilities; and
- Recyclable material wholesalers.

Alternatively, establishments in the recycling manufacturing sector are considered to be downstream consumers of recovered materials who rely on local collectors and processors for their supply of materials. When the two groups are compared, local collection and processing make up approximately 61 percent of total recycling employment and 68 percent of recycling receipts, whereas downstream manufacturing makes up the remaining 39 percent of recycling employment and 32 percent of recycling receipts. On state and national levels the results are typically reversed, with the majority of recycling employment and receipts derived from recycling manufacturing activities. It is thought that the City's dedication to diversion (with resulting collection and processing infrastructure for collected materials) and special access to export markets through local port facilities partially explains this difference and allows the collection and processing sectors to thrive.

Comparison of Industry Sector Sizes

Figures ES-1 and ES-2 illustrate the size of each industry sector. As Figures ES-1 and ES-2 show the economic size of the recycling processing sector leads the recycling collection, recycling manufacturing, and reuse sectors in size.

Figure ES-1
Employment by Industry Sector

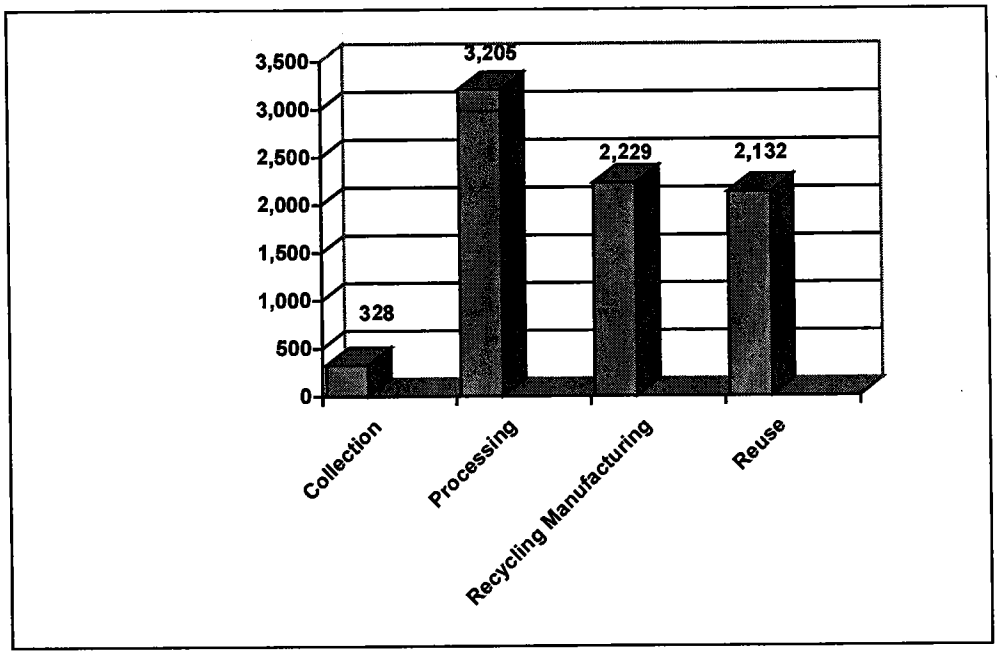
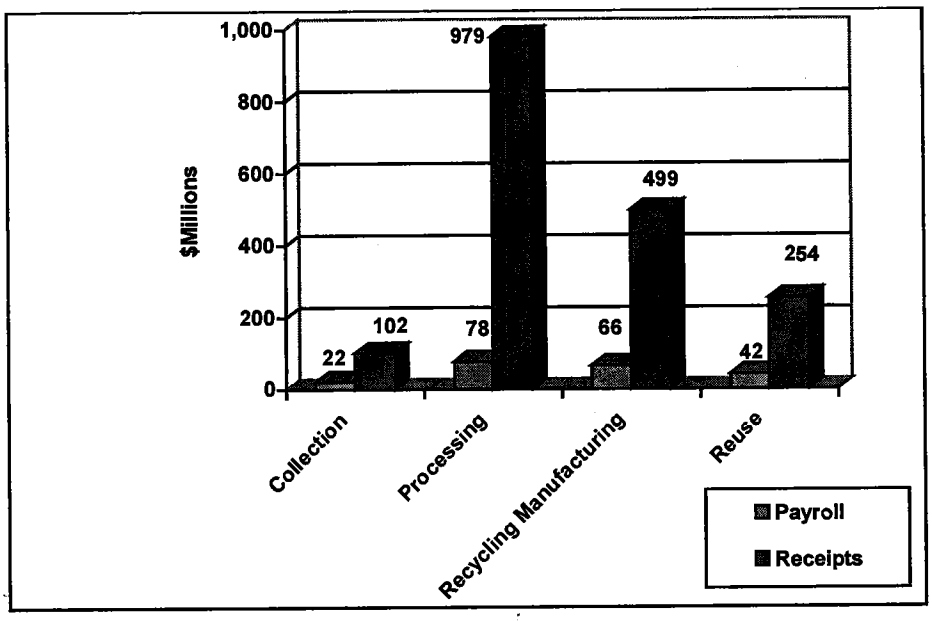


Figure ES-2
Payroll and Receipts by Industry Sector



Figures ES-3 and ES-4 show how the size of the City's major recyclable materials manufacturing industries compare to each other. As the figures show, manufacturing recycled-plastic containing products leads the other major materials groups, with manufacturing from paper and nonferrous metals following closely.

Figure ES-3
Recycling Manufacturing Industry Employment by Major Material Group

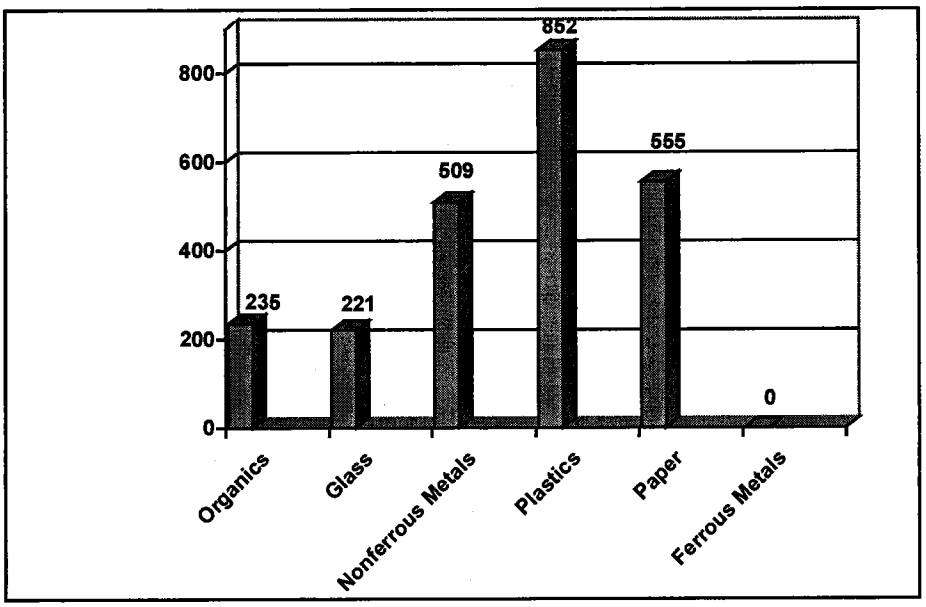
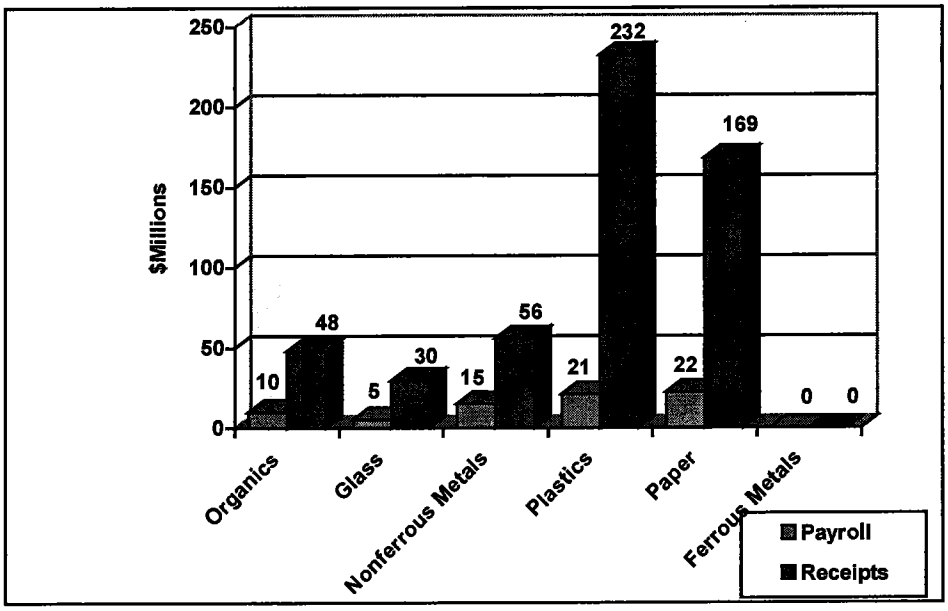


Figure ES-4
Recycling Manufacturing Industry Payroll and Receipts by Major Material Group



The amount of materials recycled, in combination with the underlying value of each raw material, help explain why some major material groups shown in Figure ES-3 and ES-4 rank higher than others. When large quantities of a high-value commodity are returned to the stream of commerce, the large intrinsic value returned to the economy can support more jobs and economic activity than if a lesser amount or lower value commodity is returned to the stream of commerce. Plastics and non-ferrous metals are at the top end of the value scale, paper is in the middle, and ferrous metals, glass, and compost are at the low end of the scale.[5] Los Angeles steel or iron mills, there fore no economic activity is shown for ferrous metals on the previous figures.

When both the quantity recycled and the value are considered together, the relative sizes of the various material groups can be explained. Similarly, estimates can be made of the economic impact that results from increased diversion of various materials.

Largest Contributors

Upon closer examination of Table ES-1, over half of the economic activity for the entire recycling and reuse industry is accounted for by the following four categories:

- Recyclable material wholesalers;
- Plastics converters;
- Motor vehicle parts (used); and
- Retail used merchandise sales.

These four categories alone account for 58 percent of all employees, 52 percent of wages, and 71 percent of total receipts.

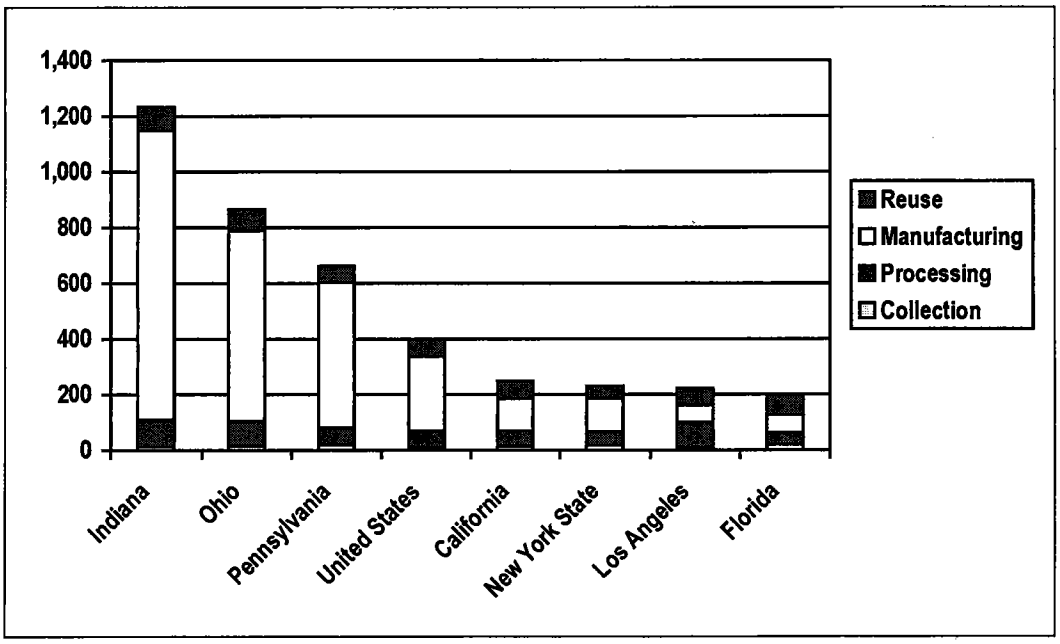
The Recycling and Reuse Industry in Perspective

Figure ES-5 shows how Los Angeles's recycling and reuse industry compares to the recycling and reuse industry of California, other select states, and the nation as a whole. Data have been normalized to an equal population basis to facilitate direct comparison. It is informative to note that normalized recycling collection, recycling processing, and reuse sectors in each jurisdiction are fairly close to each other – it is the absence or presence of recycling manufacturing that sets jurisdictions apart. This is particularly apparent in traditional industrial belt states such as Indiana, Ohio and Pennsylvania. These three states are the top three states in the nation in terms of the absolute size of their steel mill and nonferrous recycled metals industrial sectors. They also rank very high in terms of other basic materials sectors as well, which explains the size of their recycling manufacturing sectors.

[5] Approximate recovered material values in early 2002 for materials that Los Angeles processors have separated and prepared for shipment to end users are: aluminum (nonferrous) cans at $920 per ton, plastic bottles at $190 per ton (average value of separated resins), #8 newspaper at $63 per ton, steel cans at $19 per ton, and glass containers at $25 per ton. Data sources include: *Waste News*, March 18, 2002 and *Mineral Industry Surveys*, U.S. Geological Service, March 2002 (aluminum can prices).

Alternatively, the City of Los Angeles and the states of California, New York, and Florida have economies that are not as strongly based on manufacturing – as a result, recycling manufacturing is not as large in those jurisdictions as in more manufacturing-oriented states. Although this translates into less local access to end-use markets for recovered materials, the City of Los Angeles has the good fortune of unparalleled access to export markets through its local port facilities. This access to export markets in Asia and other overseas locations allows the collection and processing sectors in Los Angeles to thrive.

Figure ES-5
Employment by Sector per 100,000 State Population



Figures ES-6, ES-7, and ES-8 show how Los Angeles's recycling and reuse industry compares to other select Los Angeles industries.[6]

[6] Comparative industry information comes from the 1997 Economic Census (U.S. Census Bureau) for the following industries: Waste Management – NAICS 562 (Waste Management and Remediation Services) minus 56292 (Materials Recovery Facilities); Machinery Manufacturing – NAICS 333; Food Manufacturing – NAICS 311; Computer and Electronics Manufacturing – NAICS 334; Motion Picture and Video Industries – NAICS 5121.

Figure ES-6
Comparison of Industry Employment

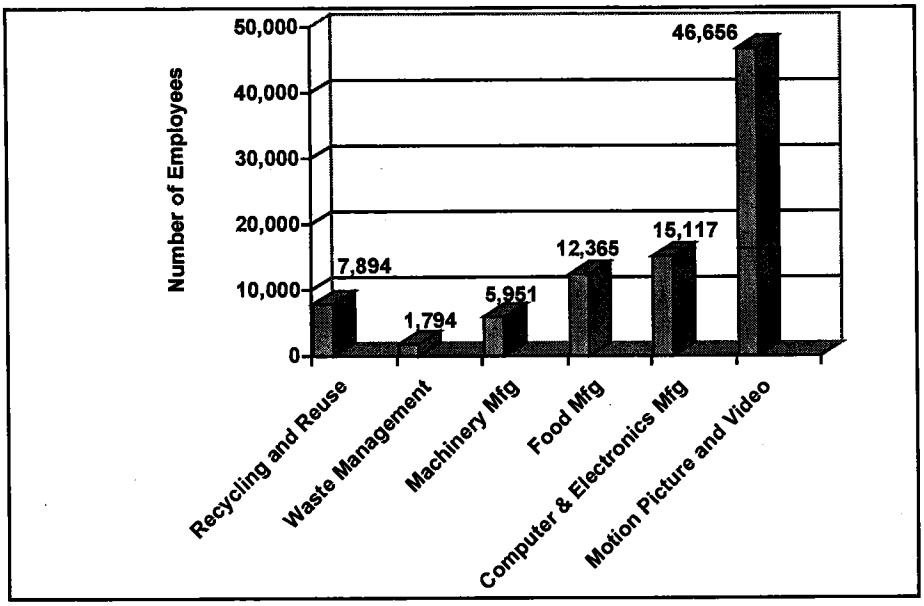


Figure ES-7
Comparison of Annual Wages per Job

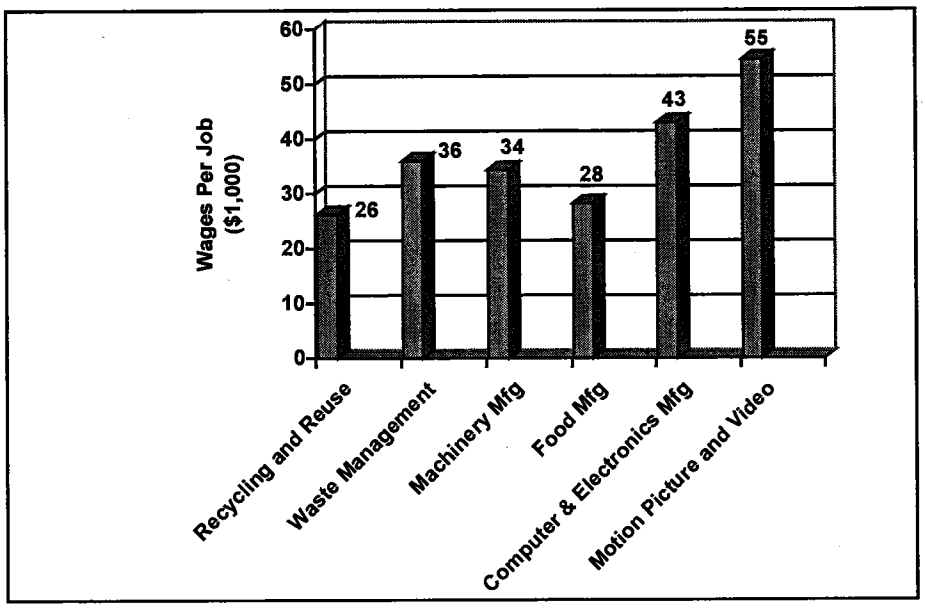
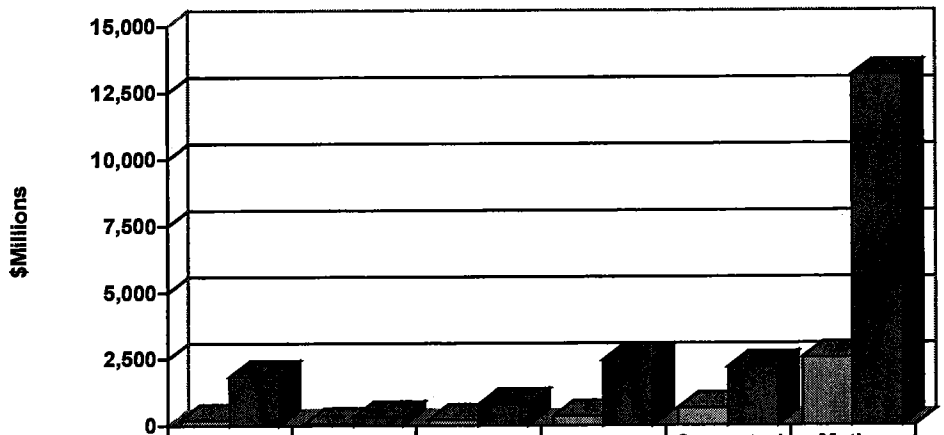


Figure ES-8
Comparison of Total Wages and Sales



	Recycling and Reuse	Waste Mgmt	Machinery Mfg	Food Mfg	Computer/ Electronics Mfg	Motion Picture and Video
Payroll	207	65	204	349	650	2,543
Receipts	1,833	307	797	2,450	2,184	13,148

As the figures show, the recycling and reuse industry is a significant industry as compared to other major Los Angeles industries. Despite the fact that more discards are disposed than recycled, it is not surprising that the recycling and reuse industry is larger than the waste management industry. This is because recycling and reuse are inherently value adding, whereas disposal is not, and value-adding processes support jobs and economic activity.

Summary of Indirect and Induced Economic Activity

In addition to the twenty-six categories of direct recycling and reuse establishments, the study estimated data for four categories of support businesses that provide goods or services to recycling and reuse industry establishments as shown in Table ES-2. The general category Other Indirect Establishments shown in the table includes all other indirect establishments that provide goods or services (such as office supply companies, accounting firms, legal firms, building and landscape maintenance firms, etc.).

TABLE ES-2
Estimates of Indirect Economic Activity of Select Support Business Categories
(Annual Payroll and Estimated Receipts are in $1,000)

Business Category	Data Type	Value
Recycling and Reuse Equipment Manufacturers	Employment	65
	Annual Payroll	1,581
	Estimated Receipts	10,083
Consulting/Engineering	Employment	49
	Annual Payroll	2,013
	Estimated Receipts	4,527
Transporters	Employment	192
	Annual Payroll	25,503
	Estimated Receipts	35,204
Other Indirect Establishments	Employment	4,195
	Annual Payroll	149,278
	Estimated Receipts	661,044
Support Businesses Totals	Employment	4,501
	Annual Payroll ($1,000)	178,375
	Estimated Receipts ($1,000)	710,858

TABLE ES-3
Summary of Recycling & Reuse Industry Contribution to Government Revenues
(In $ Millions)

Recycling Collection	1.95
Recycling Processing	7.76
Recycling Manufacturing	6.01
Reuse/Remanufacturing	4.53
Total	20.24

Conclusions

As shown by the following statistics, the recycling and reuse industry contributes significantly to the Los Angeles economy:

- The recycling and reuse industry supports 1.7 percent of the paid jobs in Los Angeles – 0.8 percent through direct employment, and 0.9 percent by industry and employee spending in the economy. [7]
- Some 1.6 percent of the total shipments, sales, and receipts generated in Los Angeles is attributable to the recycling and reuse industry, with 0.9 percent provided directly by the industry. [7]

As noted previously, the City of Los Angeles has a greater capacity for collection and processing of recyclables as compared to manufacturing using recyclable materials, which is opposite that of many other jurisdictions. It is thought that the City's dedication to diversion (with resulting collection and processing infrastructure for collected materials) and special access to export markets through local port facilities partially explains this difference and allows the collection and processing sectors to thrive.

[7] Total shipments, sales, and receipts comes from the U.S. Census Bureau's Geography Quick Report for Los Angeles, 1997.

APPENDIX K

CITY OF LOS ANGELES CERTIFIED PROCESSORS & RECYCLERS

BOARD OF
PUBLIC WORKS

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DIVISION MANAGER

433 South Spring Street, Suite 500
Los Angeles, CA 90013
Telephone: (213) 473-8228
Facsimile: (213) 473-8232
E-mail: srcrd@san.lacity.org
Website: www.lacitysan.org

August 5, 2004

Dear Permitted Waste Hauler:

SUBJECT: Change in Processor Recycling Rate for Madison Materials and Downtown Diversion

The City of Los Angeles is pleased to announce the recycling rates for Madison Materials and Downtown Diversion. Their respective rates for mixed construction and demolition materials recycling are 53.73% and 81.45%.

The table below lists the processors currently certified by the City of Los Angeles and their most current certified recycling rates.

PROCESSOR	Mixed Solid Waste Recycling Rate	Mixed C&D Debris Recycling Rate
Interior Removal Specialists (IRS) 9309 Rayo Ave South Gate, CA 90280 (323) 357-6900	N/A	48.94%
Looney Bins 11616 Sheldon St Sun Valley, CA 91352 (818) 768-7197	N/A	77.10%
Community Recycling 11215 Randall St Sun Valley, CA 91352 (818) 767-6000	6.75% (T-trash only*)	66.06%

PROCESSOR	Mixed Solid Waste Recycling Rate	Mixed C&D Debris Recycling Rate
American Waste Pendleton Facility 11121 Pendleton St. Sun Valley, CA 91352 (818) 768-1492	N/A	81.44%
BelArt Transfer Station & Recycling Center 2495 E 68th St. Long Beach, CA 90805 (562) 663-3670	N/A	19.03%
Justis Waste Recycling @ BFI/Falcon Transfer 3031 East I St Wilmington, CA 90744 (626) 255-1883	N/A	78.36%
California Waste Services 621 W. 152nd St Los Angeles, CA 90247 (310) 538-5998	N/A	65.23%
Innovative Waste Control 4133 Bandini Blvd Vernon, CA 90023 (323) 264-0202	4.42%	N/A
Downey Area Recycling & Transfer (DART) 9770 Washburn Rd. Downey, CA 90241 (562) 622-3503	Pending	Pending
Madison Materials **1035 E 4th St** **Santa Ana, CA 92701** **(714) 664-0159**	N/A	**53.73%**
Downtown Diversion **2424 E. Olympic Blvd. Bldg. 3** **Los Angeles, Ca. 90012** **(661) 810-0415**	N/A	**81.45% ****

*Community Recycling weigh tickets must indicate material type of "T-trash" or material to be run through the sorting trommel.
**The recycling rate for Downtown Diversion will be effective from the opening date of the facility but will be announced later.

Rebate requests must be submitted within 30 days after the end of the quarter for which the rebate is being requested. The total rebate cannot exceed the amount of fees paid by the waste haulers. Waste haulers requesting a rebate must be current on all payments during the quarter for which the rebate is being requested. If a hauler is past due for a quarter, the tonnages collected for that quarter are not eligible for rebate.

If you have any questions, please contact Daniel Meyers or Benjamin Novida of my staff at (213) 473-8158 or (213) 473-8152, respectively.

Sincerely,

Michele McManus

Michele A. McManus, Division Manager
Solid Resources Citywide Recycling Division

MAM:DKM:cap

cc: Dan Meyers
Ben Novida
Carol Parker
for Central File

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LOS ANGELES AREA RECYCLERS

Non-Profit Organizations

Company Name and Address	Phone/Fax Number	Additional Services Provided	Materials Accepted	Container Sizes Offered	Minimum Volume
Chrysalis 516 S. Main Street Los Angeles, CA 90013	(213) 895-7525 (213) 895-7272 FAX	Waste audits Employee Training	Aluminum cans, computer paper, corrugated cardboard, glass, mixed paper, newspaper, plastic, white paper.	N/A	30 lbs. Al. Cans 500 lbs. Paper 500 lbs. Cardboard
L.A. Conservation Corps 2824 S. Main Street Los Angeles, CA 90007	(213) 749-3601 (213) 749-4301 FAX	Employee Training	Aluminum cans, computer paper, corrugated cardboard, glass, mixed paper, newspaper, plastic, white paper.	55 gallon drums	Varies

Inclusion in this guide does not constitute an endorsement by the City of Los Angeles of any product, process or service.

(from "Mind Your Business," A Recycling Guide for Offices, L.A. Bureau of Sanitation)

LOS ANGELES AREA RECYCLERS - Cont'd

Commercial Recyclers

Company Name and Address	Phone/Fax Number	Additional Services Provided	Materials Accepted	Container Sizes Offered	Minimum Volume
ACN Recycling Industries 936 Mahar Ave. Wilmington, CA 90744	(310) 930-3838 (310) 830-7303 FAX	Waste Hauling	Corrugated cardboard, magazines, mixed paper, newspaper, phone books, white paper, most paper grades.	40 yd. roll-offs Central collection	3 tons of paper
Active Recycling 14300 Bessemer St. Van Nuys, CA 91401 5601 E. Valley Blvd. Los Angeles, CA 90032 2000 W. Slauson Ave. Los Angeles, CA 90047	(818) 785-0600 (323) 221-2555 (213) 292-2114 FAX (323-295-7774	Waste Hauling, Waste Audits, Employee Training	Aluminum cans, aluminum, brass, copper, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper.	Roll-offs Central collection	20,000 lbs. paper
Allan Company 1417 Wright St. Los Angeles, CA 90015	(213) 742-0662 (213) 742-0662 FAX	Waste Hauling, Employee Training	Aluminum cans, glass, newspaper, plastic, white paper.	1.5 cubic yards Central collection	N/A
Alpha Recycling, Inc. 13314 Saticoy St. No. Hollywood, CA 91605	(818) 982-5800 (818) 982-5268 FAX	N/A	Aluminum cans, corrugated cardboard, glass, mixed paper, newspaper, plastic, white paper.	Roll-offs Central collection	Varies
Ambit Pacific 16222 S. Figueroa St. Gardena, CA 90248	(310) 538-3798 (310) 327-7144 FAX	Waste Audits, Employee Training	Aluminum cans, corrugated cardboard, file stock, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper.	3 cubic yards Central collection	Varies

Commercial Recyclers - Cont'd

Company Name and Address	Phone/Fax Number	Additional Services Provided	Materials Accepted	Container Sizes Offered	Minimum Volume
American Waste Industries P.O. Box 23926 Los Angeles, CA 90023	(323) 268-9034 (323) 268-3736 FAX	Waste Hauling Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper.	1.5, 3 cubic yards Desktop Central collection	Varies
Angelus Western Paper, Fiber Inc. 2474 Porter St. Los Angeles, CA 90021	(213) 623-9221 (213) 623-3435 FAX	Waste Hauling Waste Audits Employee Training	Aluminum, corrugated cardboard, magazines, mixed paper, newspaper, white paper, all grades of paper.	3 cubic yards Roll-offs, Balers Desktop Central collection	Varies
Art's Disposal Service, Inc. 127 Van Norman Rd. Montebello, CA 90640	(323) 724-3918 (323) 724-5092 FAX	Waste Hauling Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, white paper, insert materials (rock, dirt, etc.).	3 cubic yards Roll-offs Desktop Central collection	Varies
Atlas Transport, Inc. 21524 Nordhoff St. Chatsworth, CA 91311	(818) 341-4745 (818) 341-4352 FAX	Waste Hauling Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, plastic, phone books, white paper.	1.5, 3,4,5,6 cubic yards Roll-offs Central collection	Varies
BFI Waste Systems of North America, Inc. 14905 S. San Pedro St. Gardena, CA 90247	(888) PICK-BFI (888) 742-5234	Waste Hauling Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, metal, mixed paper, newspaper, plastic, white paper.	1.5, 3,4,6,8 cubic yards Desktop Central collection	Varies

LOS ANGELES AREA RECYCLERS - Cont'd

Commercial Recyclers - Cont'd

Company Name and Address	Phone/Fax Number	Additional Services Provided	Materials Accepted	Container Sizes Offered	Minimum Volume
BLT Recycling 111 S. Del Norte Blvd. Oxnard, CA 93030	(805) 278-8200 (805) 278-8210 FAX	Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, plastic, phone books, white paper.	3 cubic yards Roll-offs Desktop Central Collection	2+pm paper
BTM P.O. Box 641461 Los Angeles, CA 90064	(310) 477-9636	Waste Hauling Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper, misc. items.	Many sizes available Desktop Central Collection	Negotiable
Belmont Fibers 1716 Chapin Road Montebello, CA 90640	(323) 727-9232 (323) 727-0142 FAX	N/A	Aluminum cans, corrugated cardboard, glass, magazines, mixed paper, newspaper, plastic, phone books, white paper.	3 cubic yards Roll-offs Central Collection	2-3 tons paper per week for pick up
Best Way Recycling Inc. 2268 E. Firestone Blvd. Los Angeles, CA 90002	(323) 588-8157 (323) 588-8436 FAX	Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper, non-ferrous metals.	3 cubic yards Central Collection	10 tons paper 10 tons comingled
Cal-Fiber Co. 625 S. Anderson St. Los Angeles, CA 90023	(323) 268-0191 (323) 268-1511 FAX	N/A	Newspaper	N/A	Varies
City Fibers, Inc. 2500 S. Santa Fe Ave. Los Angeles, CA 90058	(323) 583-1013 (323) 583-8424 FAX	Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper.	3 cubic yards 40 cubic yards	3-4 tons paper weekly

LOS ANGELES AREA RECYCLERS - Cont'd

Commercial Recyclers - Cont'd

Company Name and Address	Phone/Fax Number	Additional Services Provided	Materials Accepted	Container Sizes Offered	Minimum Volume
Dalton Recycling and Certified Document Destruction 555 S. Rose Street Anaheim, CA 92805	(800) 287-3295 (888) 82-SHRED (714) 635-0138 FAX	Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, white paper.	1.5, 3 cubic yards Roll-offs 30-95 gallon containers Central Collection	No minimum
Full Circle Recycling 1920 Randolph St. Los Angeles, CA 90001	(818) 386-1447 Voice Mail (323) 583-6467 FAX	Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, mixed paper, newspaper, plastic, phone books, white paper.	1.5 cubic yards 30 gallon 90 gallon Roll-offs	800 lbs. Paper
Golden State Fibers 8000 Deering Ave. Canoga Park, CA 91304	(818) 713-9330 (818) 710-9056 FAX	N/A	Mixed paper, white paper.	1.5 cubic yards Roll-offs Central Collection	1000 lbs. Paper
Master Disposal Co., Inc. 2852 Durfee Ave. El Monte, CA 91732	(626) 350-4404 (626) 444-4648 FAX	Waste Hauling Waste Audits Education-Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper.	Any size Desktop Central Collection	N/A
Paper Recycling & Shredding Specialists, Inc. 1391 E. Mission Blvd. Pomona, CA 91766	(909) 620-4421 (909) 620-9116 FAX	Specializing in Multi-Tenant high rise buildings Confidential Document Destruction	All types of office paper, baled cardboard	2,3 cubic yards 55 gallon barrels Desktop Containers	About 800 lbs. paper

Commercial Recyclers - Cont'd

Company Name and Address	Phone/Fax Number	Additional Services Provided	Materials Accepted	Container Sizes Offered	Minimum Volume
Potential Industries 922 East "E" Street Wilmington, CA 90744	(310) 549-5901	N/A	Corrugated cardboard, magazines, newspaper, N/A, white paper.	Various	N/A
Quality Paper Fibers 8405 Loch Lomond Dr. Pico Rivera, CA 90660	(562) 948-3888 (562) 948-3297 FAX	Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper. Curbside single stream.	3 cubic yards Roll-offs Central Collection	5 tons
Safeshred Co., Inc. 5928 S. Malt Ave. Commerce, CA 90040	(323) 721-4300 (323) 721-7391 FAX	Education and Training	Corrugated cardboard, magazines, mixed paper, newspaper, white paper, computer paper.	3 cubic yards 55 gallon barrels Central Collection	N/A
Shred-It California, Inc. 7617 Somerset Blvd. Paramount, CA 90723	(562) 529-2200 (800) 695-HRED (562) 529-8895 FAX	Waste Audits Education and Training	Magazines, metal, mixed paper, newspaper, plastic, white paper, computer disk, magnetic tape.	Indoor cabinets Central Collection	N/A
Smurfit Recycling Co. 20502 S. Denker Ave. Torrance, CA 90509	(310) 533-0333 (310) 328-8694 FAX	Waste Audits Training	Aluminum cans, corrugated cardboard, glass, magazines, mixed paper, newspaper, plastic, phone books, white paper, all paper recycling.	As required Desktop Central Collection 3 cubic yards Roll-offs	Varies
South Bay Recycling 15001 S. San Pedro Street Gardena, CA 90248	(310) 327-5778 (310) 327-1130 FAX		Computer paper, corrugated cardboard, magazines, mixed paper, newspaper, phone books, white paper.	3 cubic yards Central collection	Paper (call first)

Commercial Recyclers - Cont'd

Company Name and Address	Phone/Fax Number	Additional Services Provided	Materials Accepted	Container Sizes Offered	Minimum Volume
South Coast Recycling Inc. 4560 Doran St. Los Angeles, CA 90039	(818) 552-4068	Waste Hauling Waste Audits Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper, wood, demolition debris.	1.5 - 53 cubic yards Desktop Central Collection	2/Tons paper 5/Tons comingled
Summit Pulp & Paper 2016 East Bay St. Los Angeles, CA 90021 1601 S.Anderson Ave. Compton, CA 90220	(213) 362-1010 (213) 362-8764 FAX (310) 898-2500 (310) 608-2017 FAX	Waste Audits Employee Training	Corrugated cardboard, magazines, mixed paper, newspaper, office records, phone books, white paper, all baled paper grades, cans, plastic. Drop off available: M-F 8a-5p.	3 cubic yards Roll-offs Central Collection	3 cubic yards
Sun Valley Paper Stock, Inc. 11166 Pendelton St. Sun Valley, CA 91352	(818) 767-8984 (818) 767-1323 FAX	Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, mixed paper, newspaper, CRV plastic, phone books, white paper. Drop off available: M-F 7a-5p.	3 cubic yards Roll-offs	3 tons paper
Tzeng Long USA, Inc. 2801 S. Vail Ave. Commerce, CA 90040	(323) 722-5353 (323) 722-5311 FAX	Waste Audits Employee Training	Aluminum cans, corrugated cardboard, glass, mixed paper, newspaper, office records, plastic, phone books, white paper.	3 cubic yards Roll-offs Desktop Central Collection	3 tons paper
Waste Management 1970 East 213th St. Long Beach, CA 90810	(310) 830-7100 (310) 834-2540 FAX	Waste Hauling	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper.	3 cubic yards	N/A

Commercial Recyclers - Cont'd

Company Name and Address	Phone/Fax Number	Additional Services Provided	Materials Accepted	Container Sizes Offered	Minimum Volume
Waste Management 9081 Tujunga Ave. Sun Valley, CA 91352	(818) 252-3166 (818) 252-3250 FAX	Waste Hauling, Waste Audits, Employee Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, white paper.	1.5, 3 cubic yards 4, 6 yd. Roll-offs Central Collection	N/A
Weyerhaeuser Paper Company 12851 Alondra Blvd. Norwalk, CA 90650	(562) 483-6680 (562) 404-8826 FAX	Waste Audits, Employee Training	All grades of paper and corrugated cardboard.	3 cubic yards	1 ton of paper
Zakaroff Recycling Services 12949 Telegraph Rd. Santa Fe Springs, CA 90670	(562) 663-3400 (562) 663-3494 FAX	Waste Hauling, Waste Audits, Education Training	Aluminum cans, corrugated cardboard, glass, magazines, metal, mixed paper, newspaper, plastic, phone books, white paper.	1.5, 3 cubic yards 96 gallon containers Deskside Central collection	N/A

Inclusion in this guide does not constitute an endorsement by the City of Los Angeles of any product, process or service.

City of Los Angeles Neighborhood Drop-off Yards are also open Saturdays to receive recyclables. For questions, please call:1-800-773-CITY (1-800-773-2489)

COLLECTION YARDS

EAST VALLEY COLLECTION YARD
9701 San Fernando Road, Sun Valley 91352

HARBOR COLLECTION YARD
1400 North Gaffey Street, San Pedro 90731

NORTH CENTRAL COLLECTION YARD
452 San Fernando Rd. Los Angeles 90031

WESTERN COLLECTION YARD
2027 Stoner Avenue, Los Angeles 90025

WEST VALLEY COLLECTION YARD
8840 Vanalden Avenue, Northridge 91324

Area: Must be a resident within the City of Los Angeles
Level of Service: Drop-off only
Hours: 8 a.m. to 4 p.m. Monday through Saturday

ACCEPTABLE MATERIALS:

All Clean Paper: Newspaper, magazines, cardboard (must be broken down) paper bags, letters, envelopes, computer and fax paper, colored paper, catalogues, and telephone books (must be placed in paper bags or bundled)

Metal and Aluminum Cans: Empty soda, juice, soup, tuna, pet food, vegetable, empty paint, and aerosol cans

Glass Bottles and Cans: Empty soda, juice, beer, wine, water, salsa, spaghetti sauce, and other household containers

All Plastic Bottles: Empty soda, juice, water, shampoo, detergent, bleach, lotion, and other household products

Tires: No more than 4 tires per year

YARD TRIMMING DROP-OFF SITE

Community Recycling & Resource Recovery, Inc. 12011 Randall Street, Sun Valley Ca. 91352
Open Saturday & Sunday (Except Holidays) 6:00 a.m. to 6:00 p.m.
Residential yard trimmings only; maximum 6 cubic yards per visit/4 visits per month.
(Please bring your California drivers license or California ID and a copy of your utility bill.)

City of Los Angeles
Department of Public Works
Bureau of Sanitation

Produced by the Public Affairs Office

Printed on recycled paper 02/04

APPENDIX L

EXAMPLES OF REMANUFACTURING COMPANIES

RE-MANUFACTURING COMPANIES

The companies discussed below are examples of businesses that use what would typically be considered waste or secondary materials and manufacture a product from it. This activity "closes the loop" in recycling terms, meaning they produce a value-added product of waste material and re-introduce it into the consumption cycle. They also serve the valuable function of supporting the demand, and therefore value, of recyclable materials.

Windfall Lumber (Waste News January 3, 2005)

What does one do with 80-year-old vinegar tanks that are 20 feet in diameter? Well, there's the less environmentally-friendly option of dumping it in a landfill, or you can do what Scott Royer of Olympia, Washington-based Windfall Lumbers did and actually make something out of it. Windfall Lumber harvested about 250,000 board feet of the vinegar-tank wood from Los Angeles, Oakland, and Chicago. "'We reclaim old wood, so our plan is to reuse this to make beautiful products without having to use new-growth trees. What we do is look for things that are going to be deconstructed that we can make beautiful products out of,'" Johnson said.

Some products that Windfall Lumbers creates include flooring, moulding, decking, timber, butcher blocks, and a variety of hard- and softwoods for do-it-yourself projects or professional cabinetry. In order for consumers to be assured that wood comes from well-managed forests or from reclaimed sources, wood products are harvested, manufactured and sold under the supervision of various certification organizations such as the Forest Stewardship Council (FSC), Smartwood Certified Forestry (SCF), and Healthy Forests Healthy Communities (HFHC). Windfall Lumbers also provides services such as milling logs, crafting wood products from a customer's own supply, and custom milling. In Royer's words, "'I guess Windfall is just another way of looking at the same problem, [by] saving forests as well as preventing landfills from expanding as well.'"

Recycline, Inc. and Stonyfield Farm (Waste News January 3, 2005)

Recycline's Preserve toothbrush line is made entirely from 100 percent recycled plastic, 65 percent of which comes from Stonyfield Farm's used polypropylene yogurt cups. Stonyfield Farms takes back used yogurt cups from their consumers: enough that roughly 2,000 to 3,000 pounds of recycled No. 5 plastic is sent to Recycline each month. The cups are then sent to plastics processors who grind and combine the yogurt cups with pre-consumer recycled polypropylene to create pellets that are then made into Recycline products. Consumers are only obligated to clean their yogurt cups before mailing them back; any cups that are too dirty are thrown away instead of recycled. Pre-consumer

polypropylene feed includes waste created during the manufacture of containers as well as containers that became obsolete before use due to product design changes.

In 1997 the EPA recognized Recycline as a "Partner for Change." John P. DeVillars, administrator of the EPA's New England Office, is quoted on Recycline's website (www.recycline.com) as saying, "The efforts undertaken by Recycline prove that businesses can green the economy while staying in the black."

Rehrig Pacific Company

For more than 80 years, Rehrig Pacific has been helping companies handle and transport a diverse range of products. Today, Rehrig has grown into the world's largest plastic container manufacturer and an international company with a product line that includes crates and pallets designed for handling, storing and transporting products in the agriculture, bakery, beverage, dairy, environmental and materials handling marketplaces. Rehrig has a company policy of using only 100% recyclable materials throughout the product line. There is also a company mandate about strict recycling practices and products are designed to contain as much as 100% recycled material, depending on strength requirements. Environmental friendliness is further helped by the use of non-heavy metal colors.

Interface, Inc.

Interface, Inc. began in 1973 when founder Ray Anderson recognized the need for flexible floorcoverings for the modern office environment. Since then, Interface has grown to become the world's largest commercial carpet manufacturer with manufacturing locations on four continents and offices in 25 countries.

While Interface is noted in its industry for its commitment to high quality design and innovation, the company is fast gaining a reputation as a corporation carrying the banner for the environment. Inspired chiefly by Paul Hawken's treatise, The Ecology of Commerce, Ray Anderson heightened the company's awareness and led changes in technology in an effort to move toward being environmentally sustainable. Interface strives to ensure that every new product is conceived within The Sustainable Design Model created by David Oakey, the industry-leading designer who guides their global modular product development effort. This model dictates the use of renewable materials that can be easily reclaimed and recycled, or even composted, with an overall reduction in materials used. The company has incorporated a QUEST waste reduction program; the use of renewable energy such as solar and wind power; smarter design; and has achieved continuous reduction in harmful emissions.

Because the commitment Interface has made is so unique, both in terms of the industry and business in general, the environmental community has embraced the company and lauded its efforts. Ray was named co-chairman of the President's Council on Sustainable Development in 1997, and received the inaugural Millennium Award from Global Green, presented by Mikhail Gorbachev in September 1996. He was also recognized in 1996 as the Ernst & Young Entrepreneur of the Year for the Southeast

Region, and as the Georgia Conservancy's Conservationist of the Year in 1997. Interface, Inc., was named one of the Top 100 Companies to Work For in America by FORTUNE magazine in 1997 and 1998. In January 2001, Ray was selected by the National Academy of Sciences to receive the prestigious George and Cynthia Mitchell International Prize for Sustainable Development, the first corporate CEO to be so honored.

Denton Plastics

This Oregon-based company began in 1983 with a vision to establish a business creative in its approach, to make a difference, and to affect a positive change. The idea behind Denton is simple enough: collect plastics materials, grind them, and sell, the regrind to make new plastics products. The company processes a multitude of thermoplastics for products such as flowerpots, tire-chain cases, and stackable, desktop filing trays for the office. Denton's major suppliers of plastic waste are commercial and industrial corporations; Denton also solicits nurseries, recycling centers, schools, shopping centers and large distribution centers for their waste. Starting out as a one-man brokerage in 1983, Denton Plastics is now in the top 50 plastics recyclers in the United States, based on volume, recycling 3.5 million to 4 million pounds of plastic per month.

Denton's clients are varied: from large corporations such as Intel, Lucent Technologies and SC Johnson & Sons to smaller regional companies such as nursery supplier McConkey & Co.

Crossroads Recycled Lumber

Since 1981, this North Fork, CA based company has been supplying quality old growth timber for homes and commercial projects. Their recycled lumber has been used for flooring, siding and paneling. In fact, in 1999 and 2000 Crossroads supplied over 200,000 board feet of lumber for the San Francisco Giants museum. The recycled wood at Crossroads may be sold either as is, ground or sanded, sandblasted, or re-sawn, depending upon the particular project. The majority of their wood is salvaged from industrial buildings, bridges, barns, docks, railroad lines, or from the logging of standing hazard trees.

Wellman, Inc.

An international Fortune 1000 corporation, Wellman, Inc. is one of the world's largest recyclers of plastics, with the capacity to reclaim almost 3 billion PET bottles and containers annually around the globe. Their polyester fiber, Fortrel EcoSpun, is manufactured in their Johnsonville, South Carolina and County Meath, Ireland plants. EcoSpun is made entirely from 100 percent post-consumer recycled plastic bottles. EcoSpun has been independently certified by Scientific Certification Systems, the U.S. leader in evaluating environmental claims. EcoSpun products are popular with outdoor manufacturers such as Patagonia and Sierra Club.

Clothes Made From Scrap, Inc.

Founded in 1994 by Graham Jarrett, this Florida-based company has been manufacturing and marketing a line of clothing and accessories made from recycled plastic soda bottles and reclaimed cotton (pre-consumer waste from cotton mills). The company's products include T-shirts, totes and bags, caps, golf/polo shirts, sweatshirts, aprons, recycled t-shirts for children, etc. Clients include government agencies, municipalities and businesses such as Disney.

Counter Production LLC

Counter Production LLC is the sole manufacturer of VETRAZZO^{tm} countertop surfaces, a durable mineral-based solid surface made of 80-95% recycled glass. In business since 1996, Counter Productions' clientele include Wells Fargo, The Ritz-Carlton, Whole Foods, and the Earth Pledge Foundation. The glass comes from post consumer and/or post-industrial recycled glass-such as curbside recycling. It is a member of the US Green Building Council and the US EPA Green Power Partnership. Clients for Leadership in Energy and Environmental Design (LEED) certified buildings have continuously selected Counter Production.

The Wooden Duck

The Wooden Duck started in 1995 with importing recycled teak furniture from Indonesia. Today, The Wooden Duck in Berkeley, CA continues to import from Indonesia as well as Europe and China. Not only does the company import, it also creates one of a kind furniture pieces from recycled Douglas fir. In October 2004, The Wooden Duck was recognized by the California Integrated Waste Management Board (CIWMB) for excellence in waste reduction with a WRAP award (Waste Reduction Awards Program).

Eagle Recycled Products

Orange, CA-based Eagle Recycle Products has been manufacturing recycled plastic products for over ten years. Using recycled rubber from car tires and high density polyethylene (HDPE), Eagle specializes in supplying thousands of products for golf courses, parks, tennis courts and other outdoor recreation facilities. Products run the gamut from standard chairs and benches to podiums, rope/chain and stakes, to telephone booths. Eagle products are used in many industries, from private homes to golf courses, cities, parks and recreational facilities.

Earth Saver Erosion Control Products

Earth Saver began in 1990 as an idea by Winters, CA farmer Rudy Dyck. Concerned with ways to utilize the remaining rice straw after the rice crop was harvested, Rudy discovered that by stuffing the straw into netting, the resulting bags could be used as wattles, an erosion control device with a variety of applications from protecting storm drains to controlling stormwater runoff and preserving hillsides and vineyard slopes. During the first five years of production, 40,000 tons of rice straw was utilized, saving 20,000 acres from being burned. Earth Saver wattles was tested at San Diego State University's Soil Erosion Research Lab and found to decrease off-site sediment delivery by 58%. It is recognized as a best management practice (BMP) when installed properly on slopes. Earth Savers is constantly expanding their product line with additional wattle sizes and new materials, including biodegradable and photodegradable netting.

Environmental Molding Concepts (EMC)

San Bernardino company, Environmental Molding Concepts produces its line of products from recycled material including crumb rubber from used recycled tires and recycled plastics. The feedstock comes from their sister company BAS Recycling, Inc. Black and solid color tires consist of 100 percent postconsumer, tire-derived content. EPDM tiles consist of a minimum 80 percent postconsumer, tire-derived content, and a maximum 20 percent virgin rubber. EMC's major market is the playground industry; however, they also produce drive and walkway surfacing, fitness and recreation surfacing, and architectural surfacing. It is the first playground rubber manufacturer to have its products certified by the IPEMA (International Playground Equipment Manufacturing Association).

Evergreen Environmental Services

Founded in 1984, Irvine, CA-based Evergreen Environmental is the largest waste oil collection and re-refining operation in the state of California. Their six-step CEP re-refining process yields lube base stocks, fuel oil and asphalt flux. Used lube oil, collected by trucks from garages, service stations, etc., is processed at the company's Newark, CA plant. Evergreen Oil's re-refined products meet such high standards that the base oils are purchased and blended into the brand name motor oils produced by Chevron and Unocal, as well as other independent lubricant blenders. The company operates the only fully licensed Part "B" re-refinery in the Western United States dedicated to the production of virgin-like quality lube base oil from used lube oil.

Trex Company

Trex is the manufacturer of innovative decking and railing; products are made from recycled plastic grocery bags, reclaimed pallet wrap and waste wood (50/50-wood/plastic). Trex decking lumber is the only one of its kind to be code-listed by the nation's three major building code agencies. Trex was founded in 1996 by four Mobil executives and went public in 1999. Its headquarters and production plan in Winchester, VA receives and estimated 50% of recycled grocery bags available on the market. Trex purchases roughly 300 million pounds of used PET and an equal amount of hardwood sawdust each year.

A.E.R.T., Inc.

A.E.R.T composites began commercial use in 1989 as thresholds, bottom door rails and subsills for several national door companies, including Peachtree and Therma-Tru Doors. In 1992, A.E.R.T. introduced its line of decking products known as Choicedek. Choicedek is manufactured from 50 percent postindustrial wood and 50 percent postconsumer plastic. It has been used in numerous applications from coast to coast with commercial use at South Padre Convention Center at South Padre Island, TX; Cape Cod National Seashore, MA; Morrison Knudsen Nature Centre in Boise, ID; and Knotts Berry Farm, CA, to name a few.

All Paper Recycling

Based in New Prague, MN, All Paper Recycling is the manufacturer of shetkastone, a novel product made from 100% pre and post consumer waste paper. Unlike many paper processors, shetkastone is made from all types of paper: waxed paper, glossy paper, magazines and telephone books. The shetkastone-patented process involves turning all types of pre and post consumer waste paper into a slurry, which is then formed into a hardened product. The end result produces 36 inch-square table or counter tops. The density, strength, and thickness of the product can be controlled during the process. Products range from furniture, architectural moldings, benches and chairs, to doors, soap dishes and desktop items.

All Terrain Frames

All Terrain Frames in Boulder, CO makes custom picture frames from recycled bike tires. Their frames are sold in art galleries and boutiques in Wisconsin, Colorado, New York, New Mexico, and South Dakota. All Terrain Frames recycled tire patrons are University of Colorado bikes and local bike shops.

Faswall

Faswall wall-forms are used as the forms for poured concrete wall, yet left in place to provide permanent insulation around the concrete structure as well as a durable surface to apply whatever surface finish is desired. It is made from 85 percent postconsumer wood waste and 15 percent portland cement. The K-X treatment used to create Faswall wall-forms was discovered in 1987. This patented technology allows for almost any fibrous material including waste woods, green timber, and agricultural byproducts to be combined with cement to form strong durable building products. Faswall debris can be recycled like any concrete product and reused in new cement-bonded products as an aggregate.

Fire and Light

Fire and Light formed as a partnership between the Arcata Community Recycling Center in Humboldt, CA and a group of local investors who wanted to develop an innovative plan for using crushed, recycled glass. The company's entire line of dishware and giftware is manufactured using more than 91% of recycled glass in most of its colors. Fire and Light products are created by melting crushed glass in furnaces, adding pigment, and pressing the molten glass into bowls, plates, and glasses. The company strives to find new ways to incorporate recycling into our production process, whether it's tumbling broken dishes to make Sea Glass, a product used in aquariums and decorating, or using recycled beer kegs from local microbreweries as vats to cool their ladles.