Solid Waste

This RCP chapter is meant to take a close look at some of the challenges in solid waste management that our region is facing. It will provide a framework for taking the first steps toward a solution. Because this will be an ongoing process, there are some issues – such as hazardous waste, that have not been specifically addressed. However, it is implied that many of the policies described for solid waste management will also apply to management of hazardous wastes.

THE CHALLENGE

Waste comes from homes, businesses, and industrial enterprises. Between 1995 and 2005, our region disposed of approximately 33 million tons of municipal solid waste (MSW) into local landfills each year.[1] The average resident disposes of approximately 2.5 pounds of trash a day[2] while non-residential disposal adds up to 1.2 pounds disposed for every $10 of sales receipts.[3] Although we have made great strides in reducing per capita generation – in 1990, residential disposal was estimated at 3.1 pounds per day, existing landfills will not be enough to accommodate our ever-growing population.

Traditional solid waste management strategies have relied heavily on creating high capacity, regional landfills (megafills) and, to a lesser extent in California, incineration technologies to address disposal issues. However, due to significant public opposition, unavailability of suitable land, environmental concerns, and the regulatory framework, it has become increasingly difficult to expand and/or site, permit, and operate new landfills and waste-to-energy (incineration) facilities. Federal, State, and local zoning regulations restrict the number of sites suitable for development. Restrictions on land use include areas with unstable soils and terrain, landslide-susceptibility, fault areas, seismic impact zones, land near airports, and land in 100 year flood plains. Potential landfill sites must consider migration control of leachate and methane, soil type to provide a firm foundation, hydrologic settings that will affect landfill layout and drainage characteristics, and a host of other factors. In addition, local public opinion plays a big role when landfills are being sited.[4,5]

Dwindling landfill capacity and increasing health and environmental concerns have forced both the region and the state to make concerted efforts at developing other waste management methods including reducing the amount of waste that goes into landfills. The costs for landfilling our garbage will continue to increase as landfill space decreases. These costs will ultimately be passed on to residents and businesses in the form of higher

VOLUNTARY EXAMPLES OF EPR IN THE U.S.

Xerox's Asset Recycling Management Program - a model EPR program which has led to extensive product redesign. The program has generated substantial profits by maximizing recovery of the residual value of office equipment, which the company takes back at the end of its useful life.

Interface, a global carpet company, has a program to lease carpet and recycle it at the end of its life. The company has reduced manufacturing waste by 70 percent since 1996. This has resulted in a cumulative savings of $336 million avoided costs from waste elimination activities.

Kodak's take-back and recycling program for single-use cameras has had marketing benefits in helping to dispel these products' image as throwaway items that quickly end up in the landfill.

disposal fees and eventually, in conspicuous impacts to public health and the environment.

Overflowing landfills are only a symptom of a bigger problem — the mismanagement of our natural resources. The result of this mismanagement is evident in the mountains of garbage that we produce and the associated health and environmental impacts that result. For example, to obtain the resources used in the manufacturing and production of many of the goods that we use everyday, the mining industry moves an estimated 28 billion tons of soil and rocks each year (globally).[6] A 1999 study puts this figure at 48.9 billion tons when biomass extraction is included and 8.2 tons per capita average global resource consumption. When broken down by country, figures show that on a per capita level, extraction of raw materials increases with development status.[7]

The goods produced from these resources are usually single-use products that we effortlessly replace or throw away. There is an inextricable link between our current level of resource consumption, the waste we produce, and many environmental problems. Mining leaves behind a wake of destructive impacts. From threatening local and global biological diversity through habitat destruction to increased chemical contamination, erosion, and silting of lakes and streams to toxic air pollution containing arsenic and lead emissions.[8] Our current rate of natural resource extraction has already created health and environmental impacts that will last long into future generations.

THE PLAN

We will need a combination of both short and long term solutions to effectively address our overwhelming waste problem. In the short term, we will still need to rely heavily on landfills and, when local facilities have filled to capacity, exporting our waste to other areas, leading to higher trash rates and added traffic congestion and air pollution. In the long term, we will need to change the way we think about trash and move towards a system of waste prevention and minimization. The move towards this system will take time and require a variety of waste management strategies. Our goal is to achieve maximum diversion from landfills through emerging technologies with diversion credit.

Strategies for Managing Our Waste

Landfills today are technically sophisticated, highly regulated, and closely monitored by many local and state agencies. Methane and leachate collection systems are installed in many facilities and state-of-the-art leachate[9] barriers (landfill liners) are required under current regulations. Landfill operations in Southern California have beneficial methane capture technologies that turn methane emissions into energy. Average landfill gas emissions are comprised of 50 percent methane. The Puente Hills landfill currently produces 50 MW (gross) of power from landfill capture operations which it sells to Southern California Edison.[10]

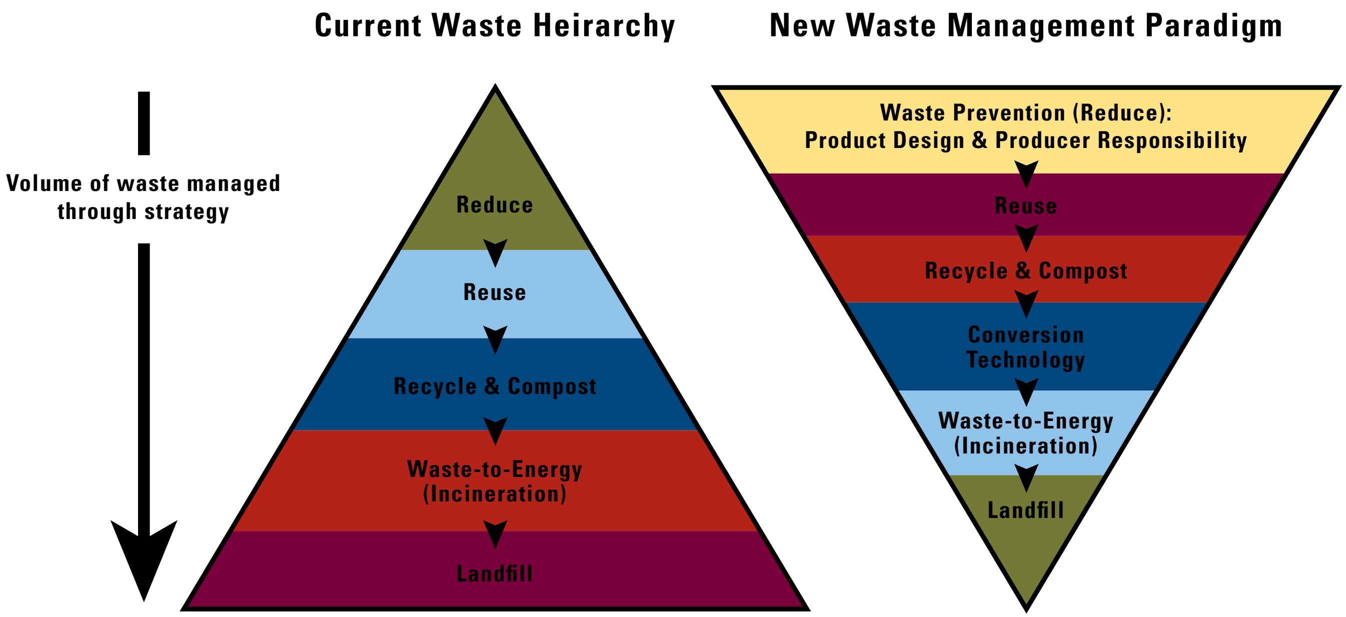
PRELIMINARY DRAFT

Landfills fill a critical need today and will continue to be needed well into the future. Even as we employ all waste prevention, recycling, reuse, composting, and conversion technology strategies, there will always be some inefficiencies in the system and therefore, waste that will need to be disposed at a landfill. The challenge will be to change our ideas of resource consumption and waster and to begin to think of disposal to landfills as the last resort in waste management. Many of today's health and environmental concerns will become less of a problem as we reduce our garbage volume and become more selective about what we consider trash.

Our current infrastructure to manage waster focuses on disposal first, followed by recycling, reducing, and reusing. The water hierarchy envisioned for the future focuses on reducing first, then reuse, recycling, conversion technologies and finally disposal to land fill (see **Figure 7.1**).

Shrinking local landfill capacity is also forcing us to transport waste to more distant landfills. A prime example of this is the planned waste-by-rail system being developed by the County Sanitation Districts of Los Angeles County. The system is designed to address the projected shortfall of disposal capacity in Los Angeles County by transporting post-recycled waste

FIGURE 7.1



WHAT ARE LOCAL COMMUNITIES DOING?

Many forward thinking communities in the SCAG region are already implementing and adopting policies to increase their waste diversion goals and ensure a better quality of life for their local residents.

- City of Los Angeles: 70 percent diversion by 2020; 90 percent by 2025
- City of Santa Monica: 70 percent diversion by 2010
- City of Pasadena: No waste to landfills and incinerators by 2040
- 16 cities/townships in San Bernardino County have partnered to educate their residents and businesses on waste reduction, reuse and recycling.

to an out-of-county landfill. The rail system will have multiple starting points at large-scale materials recovery facilities throughout Los Angeles County.[11] Existing rail lines will be used to transport the waste to Mesquite Regional Landfill, in Imperial County located approximately 35 miles east of Brawley. The 2,290 acre landfill is nearing the final stages of construction and is expected to be operational by 2011/2012. It is permitted to accept up to 20,000 tons of waste per day from L.A. County and 1,000 tons per day from Imperial, with a maximum capacity of 600 million tons of solid waste over a 100 year lifespan.[12, 13] Due to potential air quality impact that may result from solid waste rail operations, it is expected that L.A. County waste by rail operations will be consistent with strategies developed for the Air Quality Management Plan (AQMP) and the Regional Transportation Plan (RTP).

Although exporting waste is not a preferred waste management option, it is a necessary strategy for ensuring the County has a place to dispose of the garbage generated by County residents and businesses. Unlike other states, California does an excellent job of keeping solid waste within its borders. Only 1 percent of waste generated in California is exported out of state. In the SCAG region, less than 1 percent of our waste is exported outside of the region.[14]

Diverting Garbage Away from Landfills

In 1989, the legislature passed the California Integrated Waste Management Act (AB 939).[15] This bill mandated a 50 percent solid waste diversion[16] rate by the year 2000 for all cities, counties, and applicable regional agencies in California, but did not include a plan or funding for achieving the diversion rate.

Since then, Californians have done a great job in reducing the amount of waste sent to landfills. Although not all individual jurisdictions have managed to achieve the 50 percent diversion rate, all jurisdictions are making good-faith efforts to comply with the unfunded mandate. The estimated diversion rate for California in 2006 is 54 percent. This diversion rate translates to 50.1 million metric tons of waste (out of 92.2 million metric tons of waste generated) that avoided disposal to landfills.[17] Diversion is generally defined as the reduction or elimination of the amount of solid waste from solid waste disposal (to landfill or incineration). Thus far, only source reduction (waste prevention), recycling, reuse, and composting activities are considered diversion.

Economic Benefits of Diversion

Diversion activities create jobs, add local revenue, and help stimulate many economic sectors. Some employment opportunities created by these activities include government and private staffed collectors, recyclable material wholesalers, compost and miscellaneous organics producers, materials recovery facilities, glass container manufacturing plants, plastics converters, and retail used merchandise sales. A 2001 report released by UC Berkeley stated that, "diverting solid waste has a significantly higher (positive) impact on the economy than disposing it."

Diversion also helps communities save money by avoiding payment of tipping fees on each ton of waste disposed. The UC Berkeley study estimated that statewide economic impacts from disposal and diversion at 1999 rates were approximately 17 to 20 percent higher than the impacts if all the waste had been disposed (see **Table 7.1**).[18] This is because reuse and recycling are inherently value-adding, whereas disposal is not; and value-adding processes support jobs and economic activity.[19]

The California waste stream is primarily composed of organic (food) waste, paper products, and construction and demolition debris. Harder-to-decompose items such as plastic, glass, metal, electronic, and hazardous wastes are also present in the waste stream in significant amounts. **(see Figure: 7.2).**

Reuse and Recycling

California hosts approximately 5300 recycling and reuse facilities, employing 84,000 people and generating an annual payroll of $2.2 billion with $14.2 billion in annual revenues.[20] However, California's recycling market is still on shaky ground, especially because of competition from foreign recycling markets. Many countries will pay a premium for our recyclables because they lack their own raw materials. In an effort to support the local recycling industry, the Integrated Waste Management Board has developed the Recycling Market Development Zone (RMDZ) program. The program provides loans, technical assistance, and free product marketing to businesses that use materials from the waste stream to manufacture their products.[21] Although this market development program is important, local govern-

TABLE 7.1 ECONOMIC IMPACTS OF 1999 WASTE GENERATION GOING TO DISPOSAL OR DISPOSAL AND DIVERSION

Region		Estimated Final Sales 1999 (billions of dollars)	Impact on Economy			
			Output[b] (billions of dollars)	Total Income[c] (billions of dollars)	Value Added[d] (billions of dollars)	Number of jobs created
All California	Disposal only	7.5	18.0	6.8	9.0	154, 000
	Disposal and Diversion	9.2	21.2	7.9	10.7	179,000
Southern Californiaa	Disposal only	4.1	9.6	3.6	4.7	82,000
	Disposal and Diversion	5.1	11.3	4.2	5.6	95,000

Table adapted from Goldman, G. and A. Ogishi, 2001. The Economic Impact of Waste Disposal and Diversion in California. A Report to the California Integrated Waste Management Board.

[a] Southern California region includes all six SCAG region counties plus San Diego County.

[b] Output impact is a measure of how the disposal sectors influence total sector sales in the economy.

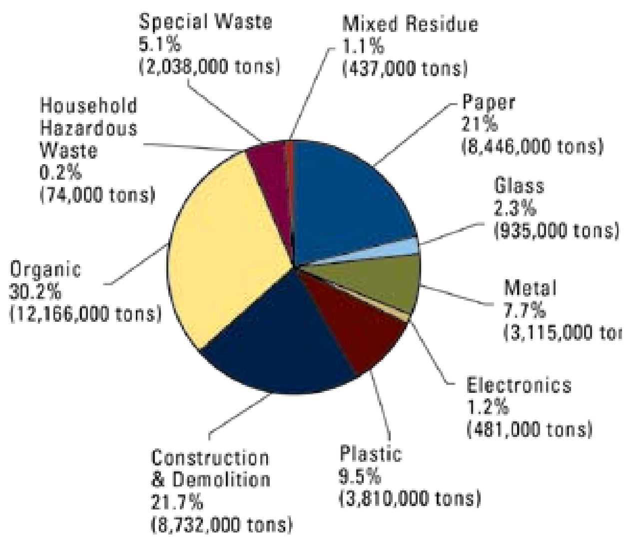
[c] Income impact measures income attributed to disposal-related economic sectors.

[d] Value added is the increase in the value of goods and services sold by all sectors of the economy.

ments have continually stressed the need for the State to take a leadership role in developing markets since our services and products are trading and competing on a global basis, and thus are susceptible to events/market fluctuations throughout the world. Based on the economic principle of supply and demand, recyclables will end up in landfills if markets are not developed or strengthened.

There are numerous benefits to recycling and reuse programs. Reuse and recycling reduce the need for landfilling and prevent pollution that may be caused by the manufacturing, transportation, and use of products from virgin materials (see **Figure 7.3**). They help conserve natural resources (timber, water, minerals); sustain the environment for future generations; save energy and avoid fossil fuel use from extractive industries; decrease emission of GHGs that contribute to global climate change; protects and expands U.S. manufacturing jobs; and increases U.S. competitiveness.[22]

FIGURE 7.2



Source: California Integrated Waste Management Board. 2004. Statewide Waste Characterization Study. (Publication # 340-04-005)

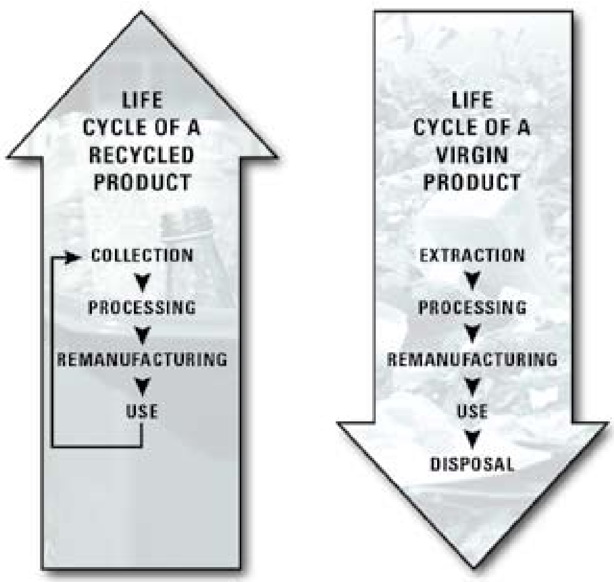
A 1994 Tellus Institute study showed that with the exception of aggregate materials for road base, many materials show energy savings by using recycled materials instead of virgin materials. The range of differences in energy saved varies greatly. At the high end is aluminum for which the difference in virgin versus secondary production is 142.68 MMBtu per ton of intermediate product (i.e., it takes 142.68 MMBtu per ton more to process aluminum from raw ore than it does to process the same product from recyclables). At the low end is molten glass for which the energy difference is only 1.54 MMBtu per ton of product.[23] A more recent life cycle assessment study from ALCOA researchers has shown that it takes 95 percent less energy to recycle aluminum than to create it from raw materials.[24]

Construction and Demolition (C&D) Debris

Construction and demolition debris comprises 21.7 percent of California's overall disposed waste stream. This equates to approximately 8.7 million tons of C&D debris disposed to landfill. Lumber debris makes up half of that figure, followed by concrete, asphalt roofing, gypsum board, and composite/ remainder C&D.[25]

Addressing C&D waste prevention can be as simple as using best management practices during construction such as advanced framing, double checking measurements to reduce sizing mistakes, and using durable materials that need less frequent replacement.[26] It also means using green building design principles to maximize the use of remanufactured, recycled, or more efficient materials or materials that are designed to be replaced in a modular manner. Unlike demolition waste, up to 80 percent of construction waste is reusable or recyclable.[27] C&D diversion rates have reached as high as 97 percent on individual State of California projects, and are typically at least 50-75 percent in green buildings.[28]

FIGURE 7.3



Source: Environmental Protection Agency. 1998. Puzzled About Recycling's Value? Look Beyond the Bin. EPA530-K-97-008. http://www.epa.gov/msw/recpubs.htm.

Cities are starting to institute green building ordinances that require maximum recycling of C&D debris for many types of new construction. Uniform statewide requirements for green building or C&D recycling ordinances do not yet exist, although state legislation has been introduced to address this issue. Currently, each city can develop its own requirements: defining the size, cost, and type of project that is subject to C&D recycling as well as the amount of material recycling required can differ a great deal from city to city.

The 2003 report to California's Sustainable Building Task Force provides a comprehensive and convincing study of the value of green building savings. It was found that although there were minimal increases of about 2 percent in up-front costs to add green building features, life cycle savings resulted in 20 percent of total construction costs – more than 10 times the initial investment. For example, an initial up-front investment of up to $100,000 to incorporate green building elements into a $5 million project would result in a savings of $1 million in today's dollars over the life of the building.[29]

Food Waste, Organics, and Composting

Californians throw away more than 5 million tons of food scraps each year. Food waste makes up 14 percent of California's waste stream. This includes all food being disposed by residences, businesses, schools, prisons, and other institutions. Green material collection programs have been implemented in many cities and counties, but not until recently has collection of food scraps been considered. Management of food scraps provides additional opportunities to help meet the State's diversion goals as well as provide greater uses for this resource. The CIWMB suggests the following order for food scrap management: (1) prevent food waste, (2) feed people, (3) convert to animal feed and/or rendering, and (4) compost. Large events and venues, public facilities (e.g., public agency and school cafeterias), and private business such as restaurants and grocery stores could all be targeted for food waste diversion activities.[30]

Decomposition of food waste and other organics are a major source of greenhouse gas emissions from landfills. Organic waste comprises 30 percent of waste disposed to landfills. That figure includes food scraps, textiles, composite organics, and green material like landscape and tree trimmings, grass clippings, and agricultural residues. Diverting organic wastes to composting prevents the production of methane, which is produced during decomposition under anaerobic (oxygen-lacking) conditions such as those found in landfills. Composting has many environmental benefits. In addition to reducing landfill volume and emissions by diverting organic waste, compost can be used in the following ways: to enhance garden and agricultural soils, in wetland construction, as landfill cover, for erosion control, and in land/stream reclamation projects. Although there are environmental concerns associated with composting, primarily emissions and odor complaints, advancements in composting technologies and proper implementation of these technologies are able to overcome these concerns.

Conversion Technologies

Conversion technologies (CTs) refer to a diverse set of processes used to convert waste products into high-value goods such as industrial chemicals or gas, liquid, and solid fuels. Fuel products can be burned to produce energy or refined for higher quality uses to make a variety of industrial products.[31] The attraction of CTs is their ability to convert landfill waste into products that can take the place of fossil fuels mined from natural resources.

CTs target *post-recycled* municipal solid waste residuals currently destined for disposal at landfills as their feedstock. That is, before waste is sent to a CT facility, it is sorted to make certain recyclables are removed and collected. Many CT proponents feel CTs with recycling offer a much better alternative than incineration or disposal to landfill. In addition, CTs have the capability of recovering additional recyclable materials, especially metals and glass that might otherwise not be feasibly recoverable since it operates at an optimum level when recyclables are extracted prior to the conversion process.

A study conducted for CIWMB compared a life cycle analysis of landfills (with various stages of landfill gas collection), waste to energy (WTE) combustion (incineration), and hypothetical conversion technologies. It was found that the hypothetical CT scenario could potentially have a two times lower net energy consumption when compared to the incineration scenario and up to 11 times lower than landfill without energy recovery. The CT scenario included energy savings (10-20 percent of the total net energy savings) from additional materials recycling prior to conversion and the offsets associated with the prevention of extraction and production of virgin materials.[32] However, the environmental benefits of conversion technology scenarios are highly dependent on their ability to achieve high conversion efficiencies and high materials recycling rates.

At the present time, conversion technologies are considered ineligible as a diversion strategy under AB939 and the permitting and siting of CT facilities has been met with opposition. Conversion technologies have been around for decades, but it is only recently that their applicability to solid waste management has begun to be fully developed. At this time, the successful development and use of CTs is occurring in Japan, Germany, and the UK.

Three main categories of conversion technologies are being developed for management of solid waste - thermal, chemical, and biological conversion – as well as systems that utilize a combination of 2 or more categories of conversion to more effectively convert the various components of the waste stream.

- Thermal (thermochemical) conversion is characterized by processes that use high temperatures to achieve high conversion rates of dry, organic material. These processes include gasification, pyrolysis, plasma arc, and catalytic cracking. *Advanced thermal conversion (advanced thermal recycling) primarily refer to technologies that employ only pyrolysis and/or gasification to process municipal solid waste.*[33] The primary products of thermochemical conversion technologies include: fuel gas (syngas - CO_2, CO, CH_4, H_2), heat, liquid fuel, char, and ash.[34]

- Biological (biochemical) conversion processes rely on microorganisms to break down the biogenic, organic fraction of the waste stream. These processes are focused on the conversion of biodegradable organics found in MSW residue into high energy products. The products of bioconversion are biogas (CH_4 and CO_2), biofuel (ethanol, biodiesel, fuel oil, etc.), and residue that can be used for compost. Biogas usually has less energy (Btu/ft^3) than syngas produced by thermal conversion systems.[35] Nonbiodegradable organic feedstocks, such as most plastics, are not convertible by biochemical processes.

LIFE CYCLE ASSESSMENTS

Life Cycle Assessments (LCAs) need not be limited to analyzing the life cycle of a single product. LCA is a methodology that can analyze the interactions of a technological system with the environment. It can be used as a decision-making tool to help weigh environmental and health impacts between various waste management options. If used correctly,[36] LCAs can answer questions like, "Are impacts from manufacturing aluminum cans from raw material really much worse than the impacts from re-manufacturing of recycled aluminum and if so, how much worse?" and "Have the costs of environmental and health impacts, such as losing ecosystem services10 and the loss of worker days been calculated into the costs?" Governments, private firms, consumer organizations, and environmental groups can all use LCA as a decision support tool.[37]

- Chemical (physicochemical) conversion processes use lower temperatures than thermal conversion and have lower reaction rates. These processes rely on chemical reactions and are focused on the conversion of organic wastes into high energy products. Processes, such as acid hyrolysis, thermal depolymerization, and fermentation, typically focus on generating fuels such as ethanol or biodiesel.

Maximizing Diversion - A New Paradigm

In the last 10-15 years there has been a strong movement to recognize the link between the waste we generate and the natural resources we consume. Today's economy is based on the extraction of "cheap" resources to make products that are largely designed to end up in landfills. Waste is a reflection of our inefficient use and mismanaged consumption of finite, natural resources. The 2004 Growth Vision recognized this and stated that "management of solid waste (and hazardous waste) must be sustainable in order to efficiently manage natural resources and in order to protect the environment today and in the future."

A new paradigm is taking shape that builds on all the waste diversion strategies that were previously discussed. Although the three Rs of solid waste management – Reduce, Reuse, Recycle – still hold true, a renewed emphasis on the first R is taking hold. We need to go beyond current waste diversion strategies by addressing waste elimination at the source and distributing the responsibility for waste on both the consumer and the producer. Instead of managing just the end results of our consumption-related activities (trash), we focus on resource conservation and management. The aim is to create a whole system approach to the way materials flow through society, where all discarded materials are resources for others to use and resource conservation and recovery is built into every process. It also means designing and managing products and processes to reduce impacts to the environment, volume and toxicity of waste and materials, and waste of natural resources, as well as managing materials flow to prevent the creation of un-recyclable products. We can probably never achieve 100 percent materials efficiency but, "we can get darn close!"[38]

Strategies to maximize diversion look at the entire product life cycle to assess the true economic, environmental, and health-related costs of manufacturing products. Life cycle assessments[39] (LCAs) attempt to appraise all the inputs and outputs that are associated with the creation and disposal of a product. Included are the direct inputs to the production process, associated wastes and emissions, and the future (downstream) fate of the product. Using aluminum recycling and production as an example, downstream effects that should be analyzed would include the energy consumption and emissions of smelters used to melt the raw ore versus recyclable cans and the ultimate fate and use of the product. In some cases, recyclables that have been locally collected are exported for use overseas.

LCAs and similar applications can identify deficiencies in a process and help compare the benefits and costs of multiple systems. By evaluating the existing materials flowing through a community, we can identify opportunities to take what one business considers a byproduct or waste and provide that material to another business that can use that material as production feedstock. In addition, an LCA that compares recycling systems with other waste management strategies (such as, disposal at landfills or disposal at conversion technology facilities) would provide useful information making future waste management actions. Such an LCA for California's waste management system would be a useful tool for local policymakers.

Promoting these types of strategies is good regional policy as existing businesses can save money by creating efficiencies in production and government agencies and other organizations have better analytical tools for making important decisions.[40]

Product Stewardship and Extended Producer Responsibility

This new paradigm requires that we change the current solid waste management hierarchy to one that focuses on product stewardship and extended producer responsibility principles because one of the most effective ways to manage waste is to prevent it from being produced in the first place.

Product stewardship is a product-centered approach to environmental protection. It extends the responsibility for a product to everyone involved in the product lifecycle. This means that manufacturers and producers design products that are recyclable, reusable, less toxic, less wasteful, and/or more durable. It also means getting rid of excessive packaging such as the cardboard box that encloses a plastic medicine bottle. Retailers and consumers are then responsible for ensuring that proper recycling and disposal of products occur.

Product stewardship is often used interchangeably with Extended Producer Responsibility (EPR). However, EPR focuses the brunt of the responsibility for creating an environmentally compatible product on the manufacturers and producers of the product. Producers retain responsibility for their end-of-life (EOL) products. This provides them with incentives for designing products for recycling, reuse and easy dismantling.[41] For example, businesses making products that are leased, such as HP (photocopiers) have long known that their products will be returned so they have learned to make remanufacturing profitable. When businesses are compelled to internalize the true costs of wasteful packaging and inefficient material use, there is incentive to create more innovative and efficient waste management strategies.

EPR policies should give producers an incentive to design products that:

- Use fewer natural resources;
- Use greater amounts of recycled materials in manufacturing;
- Can be reused;

- Can be more easily treated/dismantled and recycled;
- Reduce or eliminate the use of hazardous substances or materials in the manufacturing of products.

The EPR approach should be seen as a system for preventive environmental policy-making. EPR promotes a sustainable approach to resource use and reduces the quantity of solid waste going to a landfill, by diverting end of life products to re-using, recycling, or other forms of recovery. Many corporations are recognizing the value of EPR and have developed voluntary EPR strategies in their organizations.

The Solid Waste Action Plan

All of the strategies that have been laid out are meant to provide guidance and background for implementing the action plan that follows. The goal attempts to encapsulate the vision for solid waste and resource management that will move our region toward a more sustainable and healthier future. This will require a coordinated effort of implementing all of the short-term and long-term policies/actions that are contained within this plan. Some, of which require changing how our whole region thinks about solid waste management issues.

Recycling, composting, conversion technologies, and landfills all play a part in moving towards maximizing diversion. We will need to employ this mix of strategies to handle current waste disposal needs as we transition to a system of real natural resource management. Even if we achieve close to 100 percent materials efficiency, there will still be residual waste that will need to be disposed at landfills or managed with conversion technologies.

SOLID WASTE GOALS

- A region that conserves our natural resources, reduces our reliance on landfills, and creates new economic opportunities in the most environmentally responsible manner possible.

SOLID WASTE OUTCOMES

- All SCAG region jurisdictions should meet a 40 percent waste disposal rate [42] by 2035 to minimize disposal to landfill provided appropriate utilization of technologies are permitted and diversion credit is provided by the State for waste management strategies including, but not limited to, appropriate and environmentally sound recycling, composting, and conversion technologies with diversion credit as well as other actions and strategies contained in this chapter, such as product stewardship and extended producer responsibility.

- Conversion and other alternative technologies should be available as a diversion strategy in the next five years with one or more new conversion technology facilities sited in the SCAG region by 2020.

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
				Potential for Direct/Indirect Benefits									Other Benefits	
SCAG Policies (SCAG policies shall be subject to consideration for future Overall Work Plans)														
		X	SW-1 SCAG shall encourage all levels of government to advocate for source reduction and waste prevention.			X	X	X		X		X	X	
X		X	SW-2 SCAG shall encourage policies that: (a) promote the expansion of recycling programs and facilities that provide local recycling services to the public and private sectors and (b) encourage the development of viable, local, and sustainable markets to divert materials from landfills (e.g., recycling markets).			X	X	X		X		X		X
X			SW-3 SCAG shall adopt and implement a recycled content procurement program and participate in programs that promote the purchase of recycled content products			X	X	X		X		X		X
		X	SW-4 SCAG shall support and encourage the CIWMB to conduct comprehensive life cycle assessments of all components of the waste management practices including but not limited to, waste disposal to landfills, composting, recycling, and conversion technologies. A comprehensive analysis must include environmental impacts, health effects, emissions, use of resources and personnel, costs of same to collect wastes and recyclables, transportation costs (local, within U.S. or international), processes to separate recyclables, and production of end products using collected recyclables and raw materials.			X	X	X				X		X
	X		SW-5 SCAG shall continue to support and encourage legislation that advocates for the elimination of unnecessary duplication and/or restrictive regulations that hinder recycling, reuse, composting and conversion of solid waste and redefines conversion technologies as a diversion strategy to allow development of these facilities in the SCAG region.			X	X	X		X		X		X
		X	SW-6 SCAG should coordinate region-wide initiatives on source reduction, reuse, recycling, composting, and conversion technology to increase economies of scale.			X	X	X		X		X		X
		X	SW-7 SCAG should encourage the equal distribution of industrial impacts among all income levels from all types of solid waste management facilities including recycling, composting, and conversion technology facilities.	X		X	X	X		X		X		X
		X	SW-8 SCAG shall support the development of public education and outreach efforts to increase awareness of the benefits of a regional policy to maximize diversion.			X	X	X		X		X		X

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
			Local Government Policies											
X			SW-9 Local governments should update general plans to reflect solid waste sustainability issues such as waste reduction goals and programs (1996 RCP; 135).	X		X	X	X	X			X		X
X			SW-10 Local governments should discourage the siting of new landfills unless all other waste reduction and prevention actions have been fully explored. If landfill siting or expansion is necessary, landfills should be sited with an adequate landfill-owned, undeveloped land buffer to minimize the potential adverse impacts of the landfill in neighboring communities.	X		X	X	X	X	X		X		X
X			SW-11 Local governments should discourage exporting of locally generated waste outside of the SCAG region. Disposal within the county where the waste originates shall be encouraged as much as possible. Green technologies for long-distance transport of waste (e.g., clean engines and clean locomotives or electric rail for waste-by-rail disposal systems) and consistency with AQMP and RTP policies should be required.	X	X	X	X	X	X	X		X	X	X
X			SW-12 Local governments should adopt Zero Waste goals and practices and look for opportunities for voluntary actions to exceed the 50% waste diversion target.			X	X	X		X		X		X
X			SW-13 Local governments should build local markets for waste prevention, reduction, and recycling practices.			X	X	X		X		X		X

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X	X		SW-14. Developers and local governments should integrate green building measures into project design and zoning such as those identified in the U.S. Green Building Council's Leadership in Energy and Environmental Design, energy Star Homes, Green Point Rated Homes, and the California Green Builder Program. Construction reduction measures that should be explored for new and remodeled buildings include: • Reuse and minimization of construction and demolition (C&D) debris and diversion of C&D waste from landfills to recycling facilities. • An ordinance that requires the inclusion of a waste management plan that promotes maximum C&D diversion. • Source reduction through (1) use of building materials that are more durable and easier to repair and maintain, (2) design to generate less scrap material through dimensional planning, (3) increased recycled content, (4) use of reclaimed building materials, and (5) use of structural materials in a dual role as finish material (e.g. stained concrete flooring, unfinished ceilings, etc.). • Reuse of existing building structure and shell in renovation projects. Building lifetime waste reduction measures that should be explored for new and remodeled buildings include: • Development of indoor recycling program and space. • Design for deconstruction. • Design for flexibility through the use of moveable walls, raised floors, modular furniture, moveable task lighting and other reusable building components.	X		X	X	X	X	X		X		X
X	X		SW-15 Local governments should develop ordinances that promote waste prevention and recycling such as: requiring waste prevention and recycling efforts at all large events and venues; implementing recycled content procurement programs; and instituting ordinances to divert food waste away from landfills and toward food banks and composting facilities.			X	X	X		X		X		X
X			SW-16 Local governments should support environmentally friendly alternative waste management strategies such as composting, recycling, and conversion technologies.			X	X	X		X		X		X
X			SW-17 Developers and local governments should develop and site composting, recycling, and conversion technology facilities that are environmentally friendly and have minimum environmental and health impacts.	X		X	X	X				X		X
X		X	SW-18 Developers and local governments should coordinate regional approaches and strategic siting of waste management facilities.	X		X	X	X				X		X
X			SW-19 Developers and local governments should facilitate the creation of synergistic linkages between community businesses and the development of eco-industrial parks and materials exchange centers where one entity's waste stream becomes another entity's raw material by making priority funding available for projects that involve co-location of facilities.	X		X	X	X				X		X
X			SW-20 Developers and local governments should prioritize siting of new solid waste management facilities including recycling, composting, and conversion technology facilities in conjunction with existing waste management or material recovery facilities.	X		X	X	X				X		X
X			SW-21 Local governments should increase programs to educate the public and increase awareness of reuse, recycling, composting, and green building benefits and raise consumer education issues at the County and City level, as well as at local school districts and education facilities.			X	X	X		X		X		X

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
				Potential for Direct/Indirect Benefits									Other Benefits	
State and Federal Government Policies														
	X		SW-22 CIWMB should create waste diversion incentives to increase waste diversion past 50% including credit for conversion technology.			X	X	X		X		X		X
	X		SW-23 The State and Federal governments should develop and implement new and existing legislation that requires recycled content procurement programs, favoring the purchase of recycled and recyclable products or products with built-in EPR design in all state and federal agencies.			X	X	X		X		X		X
	X		SW-24 Federal and State governments should explore financial incentives such as tax credits, subsidies, and price supports for waste diversion activities that include waste reduction, recycling, composting, and conversion technologies.			X	X	X		X		X		X
	X	X	SW-25 CIWMB, Air Resources Board, and the California Water Resources Board should coordinate to address regulatory challenges and streamline the permitting process for solid waste conversion and composting technologies.			X	X	X				X		X
	X		SW-26 The Federal government and CIWMB should establish policies that provide (a) diversion credit for beneficial use of post-recycled, solid waste residuals managed at non-burn conversion technology facilities, and (b) separate and remove conversion technologies from the definition of "transformation."			X	X	X	X			X	X	X
	X		SW-27 Federal, State, and local governments should support and encourage federal and state incentives for the research and development of pilot or demonstration projects for solid waste conversion technologies.			X	X	X	X			X		X
		X	SW-28 CIWMB should do the following to improve education and awareness of solid waste management issues: (a) actively promote education regarding reuse, recycling, composting and solid waste conversion technology programs; (b) provide information concerning the costs and benefits of these programs to local governments; and (c) facilitate state and local government coordination of consumer awareness programs to minimize unnecessary duplication of effort in solid waste outreach programs carried out by local government.			X	X	X	X	X		X		X
	X		SW-29 The Federal government should provide funding and support for continuation of public education programs on waste management issues.			X	X	X	X	X		X		X

IGR/Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
State and Federal Government Initiatives														
	X		SWSI-1 Federal, State and local governments should support and implement source reduction policies which promote product stewardship through the following actions: • Create incentives for participation in Product Stewardship and Extended Producer Responsibility (EPR) initiatives such as, encouraging public-private partnerships with product stewardship goals (e.g. The European Green Dot system) and offering incentives to producers who use recycled content to encourage growth in the recycled contents market. • Create ordinances with EPR policies that require producers and manufacturers to produce "sustainable" packaging and products, develop life cycle assessments for products, as well as, support the development of infrastructure and markets for the recycling and reuse of these products. EPR principles that should be included are: increasing the useful life of products through durability and reparability; increasing production efficiency to produce less production waste and less packaging waste; increasing recyclable material content and reducing virgin material content; facilitating material or product reuse; and decreasing of the toxicity of products. Packaging should be easily recyclable or biodegradable based on any number of EPR strategies including, Design for the Environment (DfE) or Design for Disassembly (DfD) principles. For example, businesses such as, takeout food distributors, should utilize packaging that is compatible with recycling and composting options available.		X	X	X	X	X	X		X	X	X
	X		SWSI-2 Federal, State and local governments should create tax incentives that help companies derive profit from resource efficiency. Actions such as the following would be included: • Institute Pay As You Throw (PAYT) solid waste disposal systems. • Require that companies take back certain types of packaging for reuse or recycling:		X	X	X	X	X	X		X	X	X

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