AB 341 Report to the Legislature

California Department of Resources Recycling and Recovery

August 2015

STATE OF CALIFORNIA

Edmund G. Brown Jr.
Governor

Matt Rodriquez
Secretary, California Environmental Protection Agency

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

Scott Smithline
Director

Department of Resources Recycling and Recovery (CalRecycle)
Public Affairs Office
1001 I Street (MS 22-B)
P.O. Box 4025
Sacramento, CA 95812-4025
www.calrecycle.ca.gov/Publications/
1-800-RECYCLE (California only) or (916) 341-6300

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Executive Summary

With the passage of AB 341 (Chesbro, Chapter 476, Statutes of 2011), the Governor and the Legislature established a policy goal for the state that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020. This report, as directed by the Legislature, provides strategies to achieve that 75 percent goal.

California has come a long way since passage of the Beverage Container Recycling and Litter Reduction Act (AB 2020, Sher, Chapter 1290, Statutes of 1986) and the Integrated Waste Management Act (AB 939, Sher, Chapter 1095, Statutes of 1989). Before these landmark bills, we were vexed by single-digit recycling rates, sparse infrastructure, and few end markets for recyclables. Today we enjoy a diversion rate equivalent of 65 percent, a statewide recycling rate of 50 percent, and a beverage container recycling rate of 80 percent.

In moving away from its historically disposal-dominated approach to waste management, California developed an infrastructure for collection, sorting, and preliminary processing of recyclable materials in order to meet the state's statutory recycling and diversion directives. This was accomplished with the hard work and dedication of all of our partners including local jurisdictions, the waste and recycling industry, and an enlightened public that embraced the new programs and changed its behavior.

With this foundation in place, 75 percent is the next evolution in California's permanent campaign of sustainability. It affords us the far-reaching opportunity to strengthen our capacity to prevent the generation of waste, and to sensibly manage our discards to support a growing economy, conserve resources, lessen our climate impact, and further reduce our unhealthy reliance on landfills.

In 2020, we project there will be about 80 million tons of solid waste generated by Californians. To meet the 75 percent goal established in AB 341, 60 million tons of waste will need to be source reduced, composted, or recycled by 2020. We assume more than half of that, or about 37 million tons, will be met by continuing the source reduction, composting, and recycling programs we have today.

This means about 23 million more tons will need to be reduced, composted, or recycled in 2020 to meet the statewide goal.

Developing a comprehensive and sustainable waste management system for California that maximizes source reduction, recycling, and composting demands sufficient infrastructure to encourage waste reduction, recover materials and create markets for those materials. Through achievement of 75 percent, we can forge a future in which both the environment and the economy grow stronger by the recycling of materials in California-based markets that create new jobs and products. The strategies offered in

this report, which will further reduce waste generation and landfill disposal, have already proven to conserve natural resources and lower greenhouse gas emissions.

To many of those who have followed California's recycling and waste management efforts through the years, a number of these strategies, and the reasoning behind them, will be familiar. Measures designed to leverage the next generation of opportunities made possible by AB 939 have been topics of conversation and study, in some cases for years. These ideas are complemented by a number of new ones in this report.

Five priority strategies frame CalRecycle's recommendations in this report:

1. Moving Organics Out of the Landfill
2. Expanding the Recycling/Manufacturing Infrastructure
3. Exploring New Approaches for State and Local Funding of Sustainable Waste Management Programs
4. Promoting State Procurement of Post-Consumer Recycled Content Products
5. Promoting Extended Producer Responsibility

In addressing these strategies, we will also be faced with the challenge of breaking down barriers, some of which we have dealt with for some time. The low cost of landfilling has long undercut markets for some secondary materials, and has proven to be a disincentive to higher levels of recycling. There is limited domestic manufacturer demand for recyclable feedstock such as plastic and paper, and commercial markets for recycled-content products are underdeveloped. Local opposition can limit opportunities for a much-needed expansion of the state's recycling infrastructure. And conflicting mandates and goals among various state and local regulatory agencies can be challenging. However, these barriers can be overcome through cooperation, as demonstrated in efforts by CalRecycle and the State Water Resources Control Board resulting in the 2015 issuance of the SWRCB General Order for Composting Operations.

Pursuing 75 percent also demands that CalRecycle look inward, at the management of its programs, its priorities, and where programmatic reforms can be most effective and responsive to the challenge. This mindset is reflected in ongoing measures to improve the Beverage Container Recycling Program in order to safeguard the recycling fund, combat fraud and put resources to best use. It is important to move beyond the status quo in order to ensure the long-term viability of the program and maintain historically high recycling rates for beverage containers.

Likewise, CalRecycle's organizational focus toward 75 percent will demand new measures, as well as implementation of reforms contemplated in the past, suited to an ambitious goal to increase recycling across a wide range of materials.

What's in the Report

AB 341, pursuant to Public Resources Code (PRC) Section 41780.02 (a), required CalRecycle to submit a report to the Legislature that provides

- *Strategies to achieve the state's policy goal that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020.*

This is addressed in the section titled "Strategies to Achieve 75 Percent Goal."

In addition, the report was to include other specific components pursuant to PRC Section 41780.02(b)(5-6). These are found in the section titled "Legislative and Regulatory Recommendations" and is summarized in Appendix C:

- *Recommendations for legislative changes, if any, that are necessary to achieve 75 percent.*
- *Report on regulatory changes, if any, that are necessary to achieve 75 percent.*

The four other required components PRC Section 41780.02(b)(1-4) are found in the section titled "Program Reviews, Updates and Recommendations":

- *A review and update of market development strategies undertaken by CalRecycle and recommendations for further actions* (information required annually pursuant to subparagraph (A) of paragraph (4) of subdivision (c) of PRC Section 40507), *with emphasis on new and emerging trends in resource management.*
- *Identification of problematic waste streams and sources, and recommendations on handling those waste streams.*
- *Evaluation of current programs and their effectiveness, and recommendations for changes to those programs.*
- *Recommendations for reprioritizing existing resources to best achieve 75 percent.*

Defining 75 Percent

The legislative directive for the statewide 75 percent goal was written differently than earlier mandates for local governments. PRC Section 41780.01 does not contain the word “diversion.” Rather, it addresses only source reduction, recycling, and composting.

For the purpose of measuring statewide progress, in this report CalRecycle will use the term “recycling” for a range of activities related to source reduction, recycling, and composting, including anaerobic digestion; it excludes other waste-to-energy processes, alternative daily cover, and other beneficial reuse at landfills.

However, an activity that does not count as “recycling” for the purposes of this plan still may have value; it may still be the highest and best use of a material and could be something CalRecycle might encourage over landfilling.

More information on how we defined and quantified 75 percent, the current waste stream, and what we identified as components key to achieving 75 percent, can be found in Appendix E, titled “The Numbers: What Does 75 Percent Mean?”

From Here to There

CalRecycle is committed to using the new recycling rate to measure statewide progress in meeting the 75 percent goal. The statewide “recycling rate” for 2013 was 50 percent. Although we rightfully tout California’s “world-leading” diversion rate equivalent of 65 percent, and a beverage container recycling rate of 80 percent, we know that measuring progress with the “diversion rate” may not inspire California to reach for a higher level of waste materials being recycled into new products or removed from the landfill.

California’s high diversion rate is, in part, a result of laws that allow certain activities to be considered “recycling” for the purpose of determining diversion credit; this includes waste-derived materials being used at landfills as alternative daily cover, alternative intermediate cover, and tipping pads and roads. It also includes the use of waste tires and solid waste residuals as fuel.

Currently, we have a base of 10.7 pounds of waste generated per person a day in California. Reaching 75 percent by 2020 means the state will need to reduce/recycle/compost an equivalent of 8 pounds per person, per day, with not more than 25 percent, or 2.7 pounds per person per day, directed toward disposal-related activities.

An estimated 80 million tons of solid waste will be generated in 2020. Therefore, reaching 75 percent means about 60 million tons will need to be reduced, recycled, or composted. We assume current source reduction, recycling, and composting efforts will account for at least the same volume as in 2013—about 37 million tons. This means an additional 23 million tons will need to be recycled, reduced, or composted in 2020 to meet the statewide goal. The remaining 20 million tons would still go to disposal and

disposal-related activities (alternative daily cover, alternative intermediate cover, beneficial reuse, transformation, etc.).

The largest segments of the disposed waste stream are an obvious place to begin as California develops new recycling, processing, composting, and manufacturing facilities. Organics (food, green waste, lumber, and other organics) is the largest waste stream, followed by inert debris such as concrete, asphalt, and fiberglass, and then paper. As for who generates what, the commercial sector accounts for half the state's waste; as the Mandatory Commercial Recycling provision in AB 341 and Mandatory Commercial Organics Recycling (AB 1826, Statutes of 2014) further take hold, we should see measurable progress in that area.

Strategies for Achieving the 75 Percent Goal

CalRecycle recommends strategies that address the 75 percent goal and also serve other critical objectives: protecting public health and safety, reducing greenhouse gas emissions, expanding manufacturing infrastructure and bringing green jobs to California, reducing reliance on unstable export markets, reducing local government costs for hard-to-manage wastes, and increasing production of renewable energy and fuel.

This represents the next evolutionary phase of waste management in California, an approach that makes current goals associated with landfill diversion and program implementation equal partners with materials management to achieve the highest and best end use of discards. This will ensure 75 percent is more than a numerical accomplishment, rather one that brings into sharp focus the diverse reuse benefits of all waste stream components that could conceivably be kept out of landfills.

Notably, the current waste management system and infrastructure will need to be expanded to accommodate increases in recycling, composting and manufacturing envisioned as materials are diverted from landfills. That system integrates activities and facilities as diverse as transfer stations, material recovery facilities, composting, anaerobic digestion, rendering, recycling, product manufacturing, alternative energy production, engineered municipal solid waste and, as a last resort, transformation and landfilling. Identifying incentives for local governments to approve new or expanded facilities recognizes the significant contributions that local agencies make in siting facilities.

Five Priority Strategies

Following are the five priority strategies designed to reach 75 percent. They provide a framework for decision making but are not intended as an implementation plan. They provide a mix of statutory and regulatory changes, fiscal policies and incentives, infrastructure expansion and development, and guidance and assistance as well as insights on monitoring and enforcement. This section provides general context for the major strategies; a listing of concepts and recommendations for each strategy can be found in Appendix B, “Listing of Concepts.”

1. Moving Organics Out of the Landfill

This strategy is vital to achieving 75 percent. Organics is the largest waste stream in California, accounting for nearly one half of total disposed waste. Successfully capturing a significant portion of this material for more beneficial use as compost or mulch; as feedstock for anaerobic digestion, chemicals, and other products; biomass; or municipal thermal processes is essential.

Additionally, a greater emphasis on organics will support the state’s broader environmental goals, in particular those contained in Governor Brown’s Executive Order B-30-15 denoting five key climate change strategy pillars. Moving more organics into

the resource stream addresses four of the pillars: reducing petroleum use; increasing electricity from renewable sources; reducing the release of short-lived climate pollutants; and managing soils so they can store carbon and prevent its release into the atmosphere.

Organics infrastructure grew rapidly in the 1990s and early 2000s, but plateaued in the mid-2000s and has been static since then. The many reasons for this are addressed by specific recommendations later in this report. The current capacity for recovering organics is less than half, and perhaps as little as a third, of what will be needed to handle about 10 million tons that are still being landfilled, particularly wood waste and food.

Regulatory changes and a broader incentive framework are required to move organic materials out of landfills—from both market development and financial perspectives. Financial resources need to be secured to accelerate this transition.

2. Expanding the Recycling/Manufacturing Infrastructure: Permitting, Compliance Assistance, and Financing

Diverting an additional 23 million tons of material from landfills by 2020 depends on expanding California's current recycling (including composting and anaerobic digestion) and manufacturing infrastructure. While California has adequate capacity to handle significant increases in initial collection and processing, it does not have sufficient manufacturing or recycling capacity to accommodate such an increase as feedstock for the production of recycled-content products, compost, fuel, and electricity.

With existing remanufacturing facilities in California near capacity and only handling 2.3 million tons of recyclable commodities such as fiber, resin, and glass, international markets, particularly in Asia, have been the primary destination for these commodities over the past two decades. Shipping recyclable materials to other states or nations does not ensure California's greenhouse gas reduction goals are met. In addition, exporting recyclables further subjects California to global market uncertainties and denies Californians of the job-creating opportunities that are created when recovered materials are processed or used as feedstock for manufacturing in the state.

Successful recycling requires separation, cleaning, and processing of materials before they are shipped to manufacturers. Yet the introduction of incompatible materials sometimes makes it difficult to meet commodity specifications and leads to processing "yield loss" that ends up in landfills. The collecting, sorting, and processing infrastructure must produce a steady, clean supply of materials to meet industry specifications.

Cross-regulatory, siting, and permitting challenges increase the length of time for project approval and subsequently the cost to develop facilities. Success in meeting 75 percent hinges upon collaboration between government, business, and the public in order to overcome those barriers. Focused efforts to increase public understanding of the job

creation, public health, and environmental benefits will help pave the way for public acceptance and support. Our recommendations for expanding infrastructure by accelerating the siting of both recycling and manufacturing facilities focus on permitting and compliance assistance as well as financial incentives.

3. Exploring New Models for State and Local Funding of Sustainable Waste Management Programs

Sustainable long-term funding is needed at both the state and local levels to support the efforts needed to reach 75 percent. Funding is needed to support waste prevention programs, waste/materials management programs, and materials collection and financing infrastructure, all of which protect Californians and the environment.

CalRecycle receives no funding from the state General Fund. Waste/materials management and enforcement programs are supported by a combination of funding through tip fees charged for each ton of waste disposed at municipal landfills, advance disposal fees (such as for electronic waste, motor oil, and tires), and manufacturer assessments (for state oversight and enforcement of producer responsibility programs including carpet, paint, and mattresses). In addition, disposal-related activities such as alternative daily cover, alternative intermediate cover, beneficial reuse, and used tire-derived fuel, and non-disposal operations such as composting, anaerobic digestion, transfer stations, material recovery facilities, and transformation, are not subject to tip fees. Local governments face similar problems, as many have relied on landfill-based fees to cover the costs of recycling and composting programs.

It is important to note that revenue from tip fees is declining, and new funding models will need to be developed as we transition to increased source reduction, recycling, and composting in pursuit of the 75 percent statewide recycling goal. Relying primarily on fee-based disposal at landfills will not provide adequate funding to achieve that goal, nor sufficient funding for adequate long-term oversight of both active and closed facilities.

As landfill disposal decreases, it is important that state and local program funding, particularly for source reduction and diversion, not be based solely on landfill disposal or tip fees. Local governments and CalRecycle are working toward transitioning to a sustainable “materials management” funding model that focuses on productive use/reuse and sustainable life cycle management of materials. Such a funding structure for all materials, regardless of how they are managed, will need continuous adjustment in order to be responsible, as well as responsive to the markets.

4. Promoting State Procurement of Post-Consumer Recycled Content Products

Purchasing products with post-consumer recycled content provides multiple benefits to California. By promoting the purchase of such products when appropriate, the state positively influences the development of recycling markets. Only a small portion of overall state spending, less than $200 million annually, is known to be on products with post-consumer recycled content; the full potential for purchase of such products as part

of the $14 billion in state goods and services purchasing is unknown. State government can expand its environmentally preferable procurement and fully embrace its capacity as a regulatory entity to create programs and provide incentives for these products.

5. Promoting Extended Producer Responsibility

Extended Producer Responsibility, also known as Product Stewardship, is a strategy to place a shared responsibility for end-of-life product management on producers and all entities involved in the product chain, rather than making the consumer and local governments largely responsible. This results in the incorporation of the costs of treatment and disposal into the total cost of a product, and as a result, the producer or brand owner considers end-of-life management in the design process. Extended producer responsibility also creates a setting for waste reduction and encourages markets to emerge that truly reflect the environmental impacts of a product.

State-level product stewardship programs for carpet and paint are in the implementation phase, and one for mattresses is in the early stages of development. Numerous local governments in California have demonstrated their support by adopting producer responsibility resolutions. With general authority to implement a systematic and consistent approach, CalRecycle would be able to more efficiently and effectively educate all stakeholders.

Other Pillars of Statewide Strategy

In addition to the five priority strategies, this report also includes concept recommendations for ongoing CalRecycle work. The strategies are clustered into three focus areas:

- Source Reduction
- Commercial Recycling
- Other Products (packaging, waste tires, e-waste and used oil)

Transitioning from a system based on waste discards to one that considers materials management can provide new ways to frame old issues. The infrastructure and market development concepts recommended in this report support the highest and best use of discarded materials, particularly recyclable commodities that provide lower-cost feedstock for industry to manufacture new products. However, depending upon market demand for commodities, there will be residuals that cannot be recycled or composted but should nevertheless not be landfilled. These materials that fall through the cracks have value through conversion to energy, and although this is not considered recycling it may be a more desirable outcome than landfilling.

Legislative and Regulatory Recommendations

The legislative and regulatory changes recommended below reflect the most important needs identified by CalRecycle based on an evaluation of market development strategies, trends in resource management, problematic waste streams, program barriers, and stakeholder comments. The 12 concepts requiring statutory or regulatory changes are listed below and are described in more detail in Appendix C. Several concepts also include a supporting role for CalRecycle in either enforcement, analysis/research, or collaboration with other agencies, as noted in Appendix D.

Statutory Changes Recommended

- Organics—mandatory organics recycling **(Concept 1)**
- Organics—phase out of green waste alternative daily cover **(Concept 2)**
- Expand Recycling Infrastructure—solid waste facility inspections **(Concept 9)**
- Expand Recycling/Manufacturing Infrastructure—financial incentives **(Concept 15)**
- State Funding Models—approaches to supplement **(Concept 18)**
- Promoting extended producer responsibility—framework **(Concept 21)**
- Other Products—packaging **(Concept 28)**
- Other Products—e-waste **(Concept 30)**
- Other Products—used oil **(Concept 31)**

Regulatory Changes Recommended

- Organics—composting and in-vessel digestion **(Concept 3)**
- Expand Recycling Infrastructure—facility types and permitting **(Concept 7)**
- Expand Recycling Infrastructure—reporting **(Concept 10)**

Program Reviews, Updates, and Recommendations

In addition to providing strategies to achieve 75 percent by 2020, this report also includes the following topics as outlined in PRC Section 41780.02 (b).

1. Review and update of market development strategies with emphasis on new and emerging trends in resource management.
2. Identification of problematic waste streams and recommendations for handling.
3. Evaluation of program effectiveness and recommendations for change.
4. Recommendations for reprioritizing existing resources to best achieve 75 percent.
5. Recommendations for legislative and regulatory changes to achieve 75 percent.

1. Market Development Strategies

The broad-based success of AB 939 has dramatically increased the volume of reusable material available to commercial markets. It also has demonstrated that in the absence of sweeping mandates for the inclusion of recycled materials in manufacturing and the purchase of recycled-content products, the establishment and steady growth of market-based solutions is paramount. Stimulating and sustaining markets that value secondary materials in the conduct of commerce is essential to achieving 75 percent and all the environmental and economic benefits 75 percent will deliver.

To date, our policies and programs have struck a balance between mandated diversion and minimum content requirements, with research, incentives, and financial assistance to spur private enterprise to transform California's waste stream into a supply stream. Today there are 150,000 or more recycling-related jobs in California, and hundreds of businesses either producing or using waste-derived feedstock in manufacturing and product development. In conjunction with preparing this report, CalRecycle produced a study indicating up to 100,000 additional jobs could be created in the state by achieving 75 percent if all the new material diverted from landfills were processed and used for manufacturing here in California. The study is discussed in more detail in the section titled "Green Jobs."

There are, however, challenges that limit market-based growth of the recycling economy, which must be addressed in order to achieve 75 percent. To increase the amounts and types of materials recycled, and to expand private sector use of such materials in California-based delivery and production systems, we must intensify our combined mandate and market development efforts. That focus provides the backbone for spurring the recycling economy by enabling and supporting expansion of processing and manufacturing infrastructure to accommodate higher recycling and recycled-content feedstock.

As stated previously, the comparatively low cost of landfilling continues to suppress the reuse of some materials. And, because we function in a global marketplace for most commodities, price points for some materials incentivize their export. This undermines many of our goals, including reducing the environmental impacts of transportation and strengthening our own markets in California.

Nevertheless, the experience of the past 20 years has shown that a wide-ranging campaign to stimulate and develop markets, conducted in concert with requirements such as the 50 percent diversion/per capita disposal reduction requirements in AB 939 and the Mandatory Commercial Recycling provision in AB 341, can bring steady progress. We propose taking this ongoing effort to the next level through actions identified here.

Review of Four Market Development Approaches

AB 341 required CalRecycle to review and update information regarding four market development approaches to ensure that markets exist for materials diverted from solid waste facilities as delineated in PRC Section 40507(c)(4)(A):

- Liaison with private manufacturers to promote increased utilization of recycled feedstock in manufacturing processes (stimulate demand for recyclables and/or secondary waste).
- Assist local governments to include recycling activities in overall county economic development plans.
- Utilize available financial resources to expand recycling industry capacity.
- Improve state, local, and private procurement practices to increase demand for post-consumer recycled content products.

The following four sections provide context for each of these approaches and highlight related concepts from the concept list presented in Appendix B of this report.

<u>Promote Manufacturer Use of Recycled Feedstock</u>

Increasing manufacturer demand depends on local waste collection and processing systems that yield high-quality feedstock to meet manufacturing and industrial specifications. Materials for reuse and remanufacture primarily include recyclable fibers (paper and cloth), plastic resins, glass, metals, carpet, lumber, wood waste, and inert materials. They must first be collected and then processed before they can be utilized.

Recyclables can provide lower-cost raw materials for manufacturing if the materials are of sufficient quantity and quality to meet industry specifications. According to CalRecycle field research, nearly two-thirds of the paper, plastic, and metals found in the disposed waste stream could reasonably be expected to be recycled. This can occur through recycling programs targeting the materials upon arrival at disposal facilities for reuse, or manufacturing feedstock with minimal additional processing. This

is fundamental to the overall effort, as it diverts materials from the landfill, reduces energy use when compared with extracting and processing virgin materials, cuts greenhouse gas emissions, and shifts more economic activity away from landfilling and toward the recycling-based economy.

There are a variety of facilities within California that sort, consolidate, and prepare materials for end uses and markets. According to CalRecycle data, there is adequate processing capacity at material recovery facilities, construction and demolition processing facilities, and secondary recyclables processing facilities to accommodate significant increases in handling collected materials and readying them for the next step. Once recoverable materials or commodities are collected and sorted or processed, they are delivered to manufacturers, or frequently in the case of plastics and paper, exported.

However, changing existing manufacturing processes or suppliers is not a simple process, nor is it always cost-effective or easy to justify. Further improving our ability to reliably track material flows, particularly as it relates to feedstock volumes and quality, local and regional demands, pricing trends, and export, will enable us to strengthen the prospects of expanding in-state secondary materials processing and manufacturing using recycled-content feedstock.

Some key strategies to promote manufacturer use of recycled feedstock are described below. Promoting the use of recycled feedstock can also be accelerated with financial incentives which are discussed in the section titled “Financial Resources to Expand Recycling Industry Capacity.”

Strategies:

- **Enhance Business Assistance**—Increase CalRecycle’s ability to respond to the business assistance needs of manufacturers that use recycled materials. CalRecycle has an internal assistance team to respond directly to requests from manufacturers as well as referrals from other organizations such as the Governor’s Office of Business or GO-Biz. CalRecycle works directly with GO-Biz, including its Interdepartmental Working Group for Small Business Success; the CalEPA Small Business Programs Workgroup, and in the past, the Department of Toxic Substances Control’s Green Business Program; regional Small Business Development Centers; and other entities. CalRecycle will continue to enhance this assistance to better meet manufacturer needs (e.g., attraction, retention, and expansion services; site selection; permit assistance across agencies; and business plan development). **(Concept 17)**
- **Partnerships with Business Development Providers**—Increase the visibility of CalRecycle and Recycling Market Development Zone administrators at the local level to assist business retention, expansion or attraction. The Recycling Market Development Zone program has been a key partnership between CalRecycle and local programs for more than 20 years and is one of the linchpins to our

collective efforts to develop more recycling, composting, and anaerobic digestion infrastructure in the state. GO-Biz provides efficient mechanisms to identify interested businesses. Other key partners include county economic development staff, economic development corporations, small business development centers, the Manufacturing Extension Partnership Program, regional technology alliances, and chambers of commerce. CalRecycle can provide some technical assistance but would continue to work closely with Recycling Market Development Zone administrators. **(Concept 17)**

- **Promote the Quality and Supply of Recycled Feedstock**—Improve the "user friendliness" of CalRecycle recycling data programs and services. Provide data on recycled content for feedstock facilities within California that sort, consolidate, and prepare materials for end uses and markets is available in CalRecycle's Facility Information Toolbox, which compiles data on facilities, material flows, etc., in an accessible format for manufacturers and the economic development community. Stewarding full implementation of the Mandatory Commercial Recycling law and fostering the collection of cleaner recyclable materials to ensure a clean supply supports existing minimum content laws and will afford the state greater flexibility in expanding recycling markets and developing new ones. **(Concepts 7, 10, 17, 20 and 25)**

- **Research and Technology Demonstrations**—Transition new products or materials to the marketplace by identifying barriers and addressing them through research and demonstration, such as tire-derived aggregate. Projects can be collaborations with other departments or agencies such as Caltrans or the California Energy Commission, or they can be directly funded through grants. **(Concepts 15 and 29)**

- **Promote Zero Waste Businesses**—Develop a zero waste Web portal and collaborate with the U.S. Zero Waste Business Council to disseminate business strategies to reduce waste and increase profit by more effectively managing waste or adjusting business practices. Businesses such as the Sierra Nevada Brewing Co. in Chico have attained over 99 percent diversion. Businesses need more examples from their peers to make this transition. **(Concept 22)**

- **Business Awards**—Promote success stories of businesses that switch to recycled content feedstock and meet cost, waste management, or environmental goals. Existing award programs include the Governor's Environmental and Economic Leadership Award, Cool California, Arrow Awards, and Green Business Certification. CalRecycle is also a sponsor of the U.S. Zero Waste Business Council. **(Concept 23)**

<u>Include Recycling in County Economic Development Plans</u>

The county economic development plan provides general direction to the local government on how to focus resources to retain local business and attract new

industries. It can stand alone or be integrated into the General Plan as an optional element.

Strategies:

- **Partnerships with Planning and Economic Development Entities**—Promote recycling-based economic development by strengthening local relationships. Manufacturing with recycled content is a niche within economic development that can be incorporated and promoted through economic development plans. There are more than 300 cities and 30 counties with full time economic development staff and more than 50 regional organizations such as nonprofit economic development corporations. Other related organizations include chambers of commerce, business improvement districts, and merchant associations. CalRecycle can provide some direct technical assistance related to recycling-based economic development, but would continue to work closely with Recycling Market Development Zone administrators at the local level to educate county planning and economic development staff. **(Concept 17)**
- **Local Government Siting and Planning**—Collaborate with the Institute for Local Government to develop planning tools and case studies for recycling and manufacturing facility siting and expansion for local governments, since CalRecycle staff often do not have the technical expertise or resources to evaluate projects. Numerous siting, planning, and permitting issues are associated with balancing the regulatory objectives of multiple departments and agencies. Manufacturing facilities that use recycled content materials may not need a solid waste facilities permit, but they do require environmental review and local land-use approval, which is linked to the General Plan. **(Concept 8)**
- **Communications Plan**—Frame issues effectively and break down "not in my backyard" barriers to siting facilities with proactive, consistent, statewide or regionally focused messaging. Messaging would emphasize the positive public health, environmental, and economic benefits of siting recycling and manufacturing infrastructure as well as address environmental justice concerns. **(Concept 14)**

Financial Resources to Expand Recycling Industry Capacity

Obtaining capital and funding, including but not limited to bonds, loans, grants (for equipment, technical assistance, or research), and tax-related provisions (tax credits, deductions, or exemptions), accelerate the adoption of new technologies, use of recycled-content feedstock, and development or expansion of facilities. CalRecycle has longstanding, statutorily mandated grant and payment programs for certain materials such as beverage containers, covered electronic waste, tires, used oil, and household hazardous waste. In the Budget Act of 2014, the department was authorized, for Fiscal Year 2014/15 and 2015/16, to expend $20 million annually from the Greenhouse Gas Reduction Fund (GGRF) on grants for projects that increase the infrastructure for managing organics and for facilities that manufacture products using recycled fibers,

plastic, and glass. An additional $5 million in Greenhouse Gas Reduction Fund spending has been approved for loans toward such projects in each of those two years. These types of projects reduce greenhouse gas emissions: Organics facilities keep methane-producing material from decomposing in landfills, and using recycled material in manufacturing reduces energy use in both extraction and processing when compared with using virgin materials. Beyond the GGRF funding, however, CalRecycle does not have dedicated grant or payment programs for organics and other materials that are more difficult to remove from landfills, such as construction and demolition debris and paper.

One of the primary financial tools available through CalRecycle is the Recycling Market Development Zone loan program, but it historically has been funded at a very low level, far from what is needed to develop the manufacturing facilities that would utilize the projected volume of recyclable materials. Additional funds may be available through existing programs such as the California Energy Commission, California Pollution Control Financing Authority, California Infrastructure and Economic Development Bank, or Financial Development Corporations, or through additional spending authority to use revenue from the Greenhouse Gas Reduction Fund.

Providing incentives and financing for these projects helps to educate and encourage traditional lenders to fund new technologies or jointly fund specific projects. However, this is a stiffer challenge if the cost of landfilling remains inexpensive. The percent of equity investments in green technology, transforming current industries and creating entirely new industries like thin-film solar, biofuels, and anaerobic digestion is growing, but the costs are high—approximately $5 million to $25 million per facility. Promoting additional investment in anaerobic digestion and other beneficial reuse operations such as compost facilities, paperboard mills, resin plants, and others would put infrastructure in place to increase demand for materials that now end up in landfills.

Manufacturers and other businesses can secure lines of credit or traditional bank loans in combination with private equity, government loans, and grants when bankers recognize that sufficient markets exist to justify capital equipment expenditures. The gauntlet of regulatory, siting and permitting hurdles that vary from community to community causes project delays and increases the cost to develop organics and remanufacturing infrastructure.

Strategies:

- **Financial Incentives—**Increase loan and grant fund availability through additional spending authority to use Greenhouse Gas Reduction Fund revenue, or other existing and new sources of funding. In addition, recapitalizing the Recycling Market Development Zone loan program, while also providing for loans outside zones, is needed. Also, incentive payments for producers of desired recycled-feedstock products such as compost, and biofuels or clean energy from anaerobic digestion, would be beneficial. **(Concepts 15 and 16)**

- **Ensure Access to Capital**—Collaborate with business/business assistance organizations that provide financing directly or indirectly such as economic development corporations, Small Business Development Centers, the California Infrastructure Bank, Small Business Administration, Financial Development Corporations or traditional lenders. Attracting venture capital investors for early stages of technology development may also be effective. **(Concepts 15, 16, and 17)**
- **Permitting and Siting New or Expanded Facilities**—Streamline permitting, environmental review and compliance processes so financial institutions and businesses can have clearer approval and construction timelines for both manufacturing and recycling/processing facilities. This recommendation also includes local government planning for facility siting, including development of planning tools and case studies, as local government staff often do not have the technical expertise or resources to evaluate these projects. **(Concepts 6 and 8)**

Increase Procurement of Recycled Content Products

Procurement of recycled content products at all levels of government, and in the private sector, positively impacts the market development needed to reach 75 percent. Those individual procurement decisions also impact the greenhouse gas emissions of state operations. CalRecycle, the Department of General Services and other state agencies can work together to identify opportunities for even greater state leadership in waste reduction and environmentally preferable purchasing.

The state purchases large volumes and a wide variety of goods—approximately $12.8 billion on services and $1.5 billion on goods in 2012. The Department of General Services is the central purchasing authority for all state agencies. CalRecycle is responsible for the State Agency Buy Recycled Content program under which state agencies have mandated goals regarding the purchase of post-consumer recycled content products. State agencies are required to report annually to CalRecycle the results of their recycled content purchases for 11 categories of material types.

Despite significant time and effort, the results of the State Agency Buy Recycled Content program are unclear. Only a small portion of overall state spending, less than $200 million annually, is known to be on post-consumer recycled content products; how much of the overall $14 billion in state goods and services purchasing is for products that could incorporate post-consumer recycled content is unknown.

Understanding and influencing procurement decisions requires basic data on what goods are purchased, by whom, and in what volumes. Given the wide variety of goods purchased each year by a multitude of state agencies, this is not easy to decipher. The challenges to optimizing post-consumer recycled content purchases for particular products are not insurmountable but will require collaboration among state and local government agencies, goods providers, and end users.

Strategies:

- **State Purchasing of Post-Consumer Recycled Content Products—** Collaborate with Department of General Services, goods providers, and end users to increase demand for post-consumer recycled content products. Options to increase purchasing might include adjustments to the State Agency Buy Recycled Content program, statutory changes to improve/expand recycled content products purchasing and compliance, changes in all purchasing mechanisms (state contracts, delegated authority contracts, and service contracts that include goods procurement) to incorporate post-consumer recycled content requirements, and making product information available to purchasers through approved product certifications or eco-labels. **(Concept 20)**
- **Improve Goods Procurement Data Collection and Reporting—**Collect and analyze data to identify those with greatest potential for waste/greenhouse gas reductions and increased markets for post-consumer recycled content. Data can be collected through standardized tracking of all state purchases (Cal Card, Request for Qualifications, leveraged procurement agreements and service contracts) and through the Financial Information System for California, which integrates accounting, budgeting, cash management, and procurement. **(Concept 20)**
- **Research and Technology Demonstrations—**Identify barriers and address them through CalRecycle-sponsored research with universities and demonstrations in partnership with local agencies. Establish procedures to make it easier for state agencies to purchase innovative recycled content products to test and evaluate for future purchases. For example, Caltrans and several regional agencies have procured tire-derived aggregate as an effective alternative to conventional technologies for landfill and transportation projects. **(Concepts 20 and 29)**

2. Problematic Waste Streams

Emphasis on removing problematic waste streams from disposal is an important part of materials management and expansion of the green economy. It also preserves landfill capacity for the materials that cannot be effectively composted, recycled, or reduced. CalRecycle used four criteria to select which problematic waste streams to address in this report:

- High-volume materials going to the landfill that are suitable for diversion.
- Multi-material products that are difficult to recycle.
- Lack of market/infrastructure in California to recycle or manufacture recovered materials.
- Toxicity or hazard of materials to human or environmental health.

CalRecycle gathers comprehensive information on materials disposed at solid waste facilities throughout the state through waste characterization studies (http://www.calrecycle.ca.gov/WasteChar/WasteStudies.htm).The data is gathered from hundreds of samples taken at disposal facilities around the state and thousands of

vehicle surveys. Three comprehensive studies (1999, 2004, and 2008) provide data on waste quantity and composition for the commercial, residential, and self-hauled waste streams. A new statewide study began in 2014, and the report is expected in 2015.

In addition to standard waste stream data, detailed regional studies in 2006 examined material recovery facilities, amounts of materials disposed from construction and demolition activities, and 17 industry types to evaluate potentially applicable recovery strategies. A corollary 2008 study also examined the extent and source of contamination of commonly recycled materials and investigated sources of discarded plastic carry-out bags. Since commercial waste accounts for half of the disposed waste stream, and Mandatory Commercial Recycling programs have begun, the 2014 waste characterization study will provide insight into the commercial waste stream for 16 specific business types. Samples will be taken from trash dumpsters, recycling bins sent to material recovery facilities, and composting bins. The study will also look at other activities businesses perform to reduce their waste streams.

Using waste characterization data and other information, CalRecycle has identified opportunities and recommended strategies to more precisely define problematic waste streams that are currently landfilled. Channeling these materials toward more beneficial uses such as products, energy, or feedstock for manufacturing is a fundamental strategy to reach 75 percent. As some communities and industries have much higher diversion rates for some of these problematic waste streams, there are clearly opportunities for increased recycling statewide. One approach is to document successful programs that can be replicated. **(Concept 22)**

Organics

About one third of all waste disposed in California consists of organic materials that typically can be composted, mulched, used in anaerobic digestion or some other organics recycling process or in some cases, used as feedstock for biomass facilities. Redirecting more of this material away from the landfill will go far in determining whether we achieve 75 percent. For this discussion, compostable materials include food waste, woody waste (clean dimensional lumber, clean engineered wood and clean pallets/crates), yard waste (leaves, grass, prunings, branches, etc.) and manure. Addressing the organic waste stream requires a holistic approach: moving the materials out of landfills either through source reduction or diversion; expanding the processing infrastructure, including compost, anaerobic digestion, and other technologies; and ensuring robust markets for the finished products, energy, and fuel. A more aggressive approach addressing the broader organics issue, such as legislation disallowing organics disposal, may ultimately be deemed necessary in order to avoid current wasteful practices and strengthen California's sustainability posture.

Food is projected to be the third-largest material type of total waste disposed in 2020, at 13 percent. Our 2008 waste characterization study found that food waste had increased by 40 percent in the residential sector, and food scraps are by far the most prevalent material disposed by residents. These discards can be better managed through source

reduction, feeding people or animals, industrial uses, and composting for soil restoration. Curbside collection of food waste has been effective in some communities, but cost, facility siting and vector control are concerns.

Reducing the amount of biodegradable organic materials from the disposed waste stream is also an effective way of reducing greenhouse gas emissions. Greenhouse gas emission reductions occur due to avoided landfill emissions, displacement of fossil fuel with biogas, reduction in synthetic fertilizer or herbicide usage, decreased soil erosion, and decreased water usage. In addition, 55 percent of material currently used as alternative daily cover is organic. Although green waste is the predominant source of organic alternative daily cover (over 80 percent), such use has been declining since 2006.

While the organics infrastructure grew rapidly in the 1990s and early 2000s, it plateaued in the mid-2000s and has been static since. There are many reasons for this, including comparatively low landfill fees, competing cross-agency regulatory mandates with respect to air and water quality, difficulties in siting, multiple permits, challenges associated with scaling up technology to commercial levels, and more. It is also worth noting that financial incentives for biomass conversion facilities decreased in the late 1990s after utility rates for renewable energy were restructured. As a result of the combination of all these factors, the infrastructure has not kept pace with the consistently large volume of organic materials.

The current capacity for recovering organics is less than half, and as little as a third of what will be needed. Additional capacity will be needed to handle about 10 million tons that are still being landfilled, particularly wood waste and food. Incentives will be required to move materials out of landfills. Interest in anaerobic digestion among municipal leaders, investors, farmers, and industry executives is increasing with the recognition that this technology can generate high-value products such as compost and renewable fuels for vehicles.

Compost has a significant role to play in both managing organic waste and meeting the state's climate and healthy soils goals. CalRecycle has worked with the California Department of Food and Agriculture to identify opportunities to keep organic materials out of the landfill and return those nutrients to the land as compost in support of building organic matter in soil and fostering soil health.

However, not all organics are suitable for composting, anaerobic digestion, or biomass, and some potentially compostable or digestible wastes are too contaminated to be practically or economically recoverable. The Legislature and CalRecycle need to establish a regulatory and policy framework for changes to organics management.

Strategies:

- **Financial Incentives for Organics Infrastructure**—Expand direct and indirect financing and incentives to support compost, anaerobic digestion, and other

organics recycling facility development. Funds could be made available through dedicated Greenhouse Gas Reduction Fund revenue, revision of the tipping fee, or other existing and new sources of funding. In addition, establishing feed-in-tariffs for electricity production may increase competitiveness of in-state renewable energy production. Qualifying renewable energy from anaerobic digestion for low carbon fuel credits would be an effective incentive, as would AB 118 funding (California Energy Commission). Assistance can also incentivize the commercialization of new technologies. **(Concepts 15 and 16)**

- **Organics Disposal Phase-Out**—Opinions vary on the utility of phasing out landfilling of organics. A variety of alternatives, including legislation or direct regulation per the Waste Sector component of the California Air Resources Board AB 32 Scoping Plan, could be employed to facilitate market and infrastructure development. AB 1826 (Chesbro, 2014) will require monitoring and reporting by local jurisdictions with respect to mandatory organics recycling for businesses that generate a specified amount of organic waste per week. Phase-in of mandatory commercial organics recycling begins in January 2016. **(Concept 1)**
- **Remove Incentives for the Use of Green Waste as Alternative Daily Cover**—Phase out green waste alternative daily cover through legislation to remove AB 939 diversion credit and apply the tipping fee, or through direct regulation per the Waste Sector component of the California Air Resources Board AB 32 Scoping Plan. Through passage of AB 1594 (Williams, 2014), beginning in 2020 jurisdictions will no longer receive diversion credit for organics used as alternative daily cover at landfills. Such use will be counted as disposal. **(Concept 2)**
- **Regulatory Changes**—Move forward with compostable materials handling and in-vessel digestion regulations. Topics to address include clarifying permitting of anaerobic digestion facilities, definitions of food waste, exclusions for small scale composting, criteria for land application, mechanisms to address chronic odor complaints, and co-digestion of specific organics with wastewater at publicly owned treatment works or sewage treatment plants. **(Concept 3)**
- **Facility Siting and Permitting Process**—Streamline the permitting and environmental review process for non-landfill alternatives, and resolve cross-regulatory permitting requirements with an emphasis on reducing time, complexity and cost to permit an organics facility. Compost, chip and grind, and anaerobic digestion facilities must obtain permits from local land use and building departments, local air districts, regional water boards, and CalRecycle. Numerous permitting issues are associated with balancing the regulatory objectives of these other agencies. This recommendation also includes local government planning for facility siting, including development of planning tools and case studies, as local government staff often do not have the technical expertise or resources to evaluate projects. **(Concepts 6 and 8)**

- **Communication Plan**—Frame issues effectively and address issues to break down "not in my backyard" barriers to siting compost or anaerobic digestion facilities with proactive, consistent statewide or regionally focused messaging. Emphasize positive economic and environmental benefits of siting organics infrastructure. **(Concept 16)**
- **Local Food Waste and Composting Programs**—Document and promote effective model programs, conduct research, or provide grant funding. Residential source reduction programs to promote include grasscycling ("leave it on the lawn" programs) and backyard composting. **(Concept 4)**

Construction and Demolition Material

Construction and demolition-type materials comprise about 29 percent of total disposed waste. A large part of these materials are delivered directly to disposal facilities in loads from construction and demolition activities—these loads comprise 16 percent of all waste disposed. Construction and demolition activities include construction, remodeling, repair and demolition of houses and commercial buildings and infrastructure such as roads, rail lines, or bridges. The amount and subsectors of construction and demolition waste vary considerably by region with demolition (21 percent) and residential remodels (19 percent) being the largest sectors. Specific materials include lumber or wood waste (dimensional lumber, engineered wood like plywood, painted wood, pallets, crates, etc.), roofing, asphalt paving, concrete, drywall, rock/dirt/sand, and metals.

Approximately three-fourths of construction and demolition waste materials are divertible—that is, technologies and markets exist in California to recover the material through recycling or composting. The most prevalent divertible materials are recyclable aggregates (about 27 percent of the construction and demolition waste stream), followed by recyclable lumber or wood waste at 15 percent. There are more than 500 facilities in California that process construction and demolition materials for wholesale distribution or further processing.

Based on available recycling technologies and markets, primary materials to focus on include recyclable aggregates (particularly composition roofing and large asphalt pavement without rebar), recyclable wood waste, rock/dirt/sand, paint, and recyclable metals. Within the lumber category alone, 37 percent of the material currently landfilled is clean dimensional lumber or clean pallets and crates. However, the development of new markets and manufacturing facilities will be needed to facilitate additional recovery of materials such as drywall (soil amendments), asphalt, and lumber. CalRecycle databases currently list approximately 20 manufacturing facilities in California using recycled construction and demolition materials to produce new products such as asphalt roofing and paving materials, recycled-content paint, reclaimed lumber siding or flooring, reclaimed lumber furniture, and recycled-content lumber.

Reuse and recycling of construction and demolition materials is one component of a larger holistic practice called sustainable or green building construction. To promote

these practices, California establishes building standards and creates incentives for more sustainable buildings (CALGreen). CALGreen is adopted by the Building Standards Commission and enforced at the local level, generally by the building department. There are more than 100 local governments that have adopted “beyond green” building standards that are more stringent than state standards and include construction and demolition measures. CalRecycle staff will continue to work with local entities to see effective construction and demolition programs are replicated, and to incorporate elements of deconstruction and salvage to meet AB 939 diversion requirements. Some demonstration projects have realized diversion rates of greater than 90 percent.

Strategies:

- **Sustainable and Green Building Construction**—Expand CALGreen standards that incentivize green building practices and increase diversion of recoverable construction and demolition materials. Current standards require 50 percent waste diversion on new construction and some renovation projects, although this may be raised to 65 percent for nonresidential construction in upcoming changes to the standards. CalRecycle can also ensure that jurisdictions are enforcing their mandatory CALGreen provisions and/or construction and demolition ordinances. **(Concept 27)**
- **Financing for Processing and Manufacturing Infrastructure for Recovered Materials**—Expand direct and indirect financing and incentives to support infrastructure development. In addition, as air districts reclassify existing mobile crushers and grinders as stationary sources, funding will be needed to help processors remain in compliance. **(Concept 15)**
- **Business Assistance**—Partner with business assistance programs on attraction, retention, and expansion of construction- and demolition-related businesses, including reuse and manufacturing. **(Concept 17)**
- **Technology-Neutral Standard for Post-Recycled Residuals**—Promote recovery of construction and demolition materials suitable for reuse, compost or anaerobic digestion before residuals are considered for energy recovery. **(Concept 11)**

Fiber/Resin: Commodity Recyclables

Fiber/Resins account for one-fourth of California’s waste stream and are problematic due to lack of markets/infrastructure in California to recycle or use the material as feedstock for manufacturing, and our dependence on export markets. How much we rely on export markets, and their viability in 2020, will play a critical role in determining whether we meet 75 percent. In addition, since much of the packaging we see today is comprised of fibers and resins, discussions about this problematic waste stream are integrally linked to packaging.

Paper, including corrugated cardboard, mixed paper, and paperboard, is the third-largest category of waste disposed in landfills and projected as approximately 15 percent of total waste disposed in 2020. Uncoated corrugated cardboard is the most prevalent recyclable material, representing more than one-fourth of the fiber currently disposed. Plastic is projected to be 9 percent of total waste in 2020. One troubling trend is the increase in sales of single-use disposable beverage containers, up nearly 25 percent in the last decade due in large part to a dramatic increase in consumption of water in plastic bottles. About one-fourth of all polyethylene terephthalate (PETE or "number one" plastic) are plastic bottles smaller than one liter in size.

Export Issues

For the past 20 years, California has been exporting the majority of these recyclables to developing countries, particularly China, as their demand for lower-cost raw materials has increased. In 2013, about 18.6 million tons of recyclables were exported from California ports with a value of $7.4 billion. More than half of recycled materials exported through California ports were mixed paper/cardboard and paperboard, 42 percent were metals, 6 percent were plastics, and less than 1 percent was glass. Recyclables accounted for one-fourth of all California seaborne exports by weight.

While those international markets were a convenient and much-needed outlet for California's recycled commodities, they are subject to global uncertainties. During the 2008 worldwide economic downturn, demand for recycled commodities decreased, commodity prices plummeted, and stockpiles of recycled commodities built up at material recovery facilities and ports in California. California's precarious reliance on export markets for recycled commodities was illustrated again in 2013 when China launched "Operation Green Fence," a 10-month initiative to prevent the importation of solid waste-contaminated shipments. As it rolled out, California exports of recyclable material decreased, and prices dropped as some recyclers did not ship to China for fear of rejections. On a positive note, attention was focused on the need for higher-quality standards for the recovered commodities to appeal to recycled-content manufacturers as viable feedstock.

Although these materials can easily be exported, the largest recycling-related job gains for California would be in processing and manufacturing for recoverable paper, plastics, and inert materials. However, California's capacity is not sufficient to process or manufacture fiber- and resin-based products. CalRecycle databases currently list a small number of paper/paperboard manufacturers using recovered fiber, and they are operating essentially at full capacity. There are fewer than 100 paper stock processors currently listed that sort or consolidate paper. Yet, uncoated corrugated cardboard is the most prevalent recyclable material, representing more than one-fourth of the fiber currently disposed. CalRecycle databases currently list fewer than 50 recycled plastic manufacturers that produce new products and just over 100 processers/reclaimers that sort and consolidate materials or produce plastic pellets, granulated plastic, or plastic flake.

Related Packaging Issues

Discussions about this problematic waste stream are integrally linked to packaging since much of the packaging we see today is comprised of fibers and resins. Packaging provides numerous positive functions. For example, packaging can help to reduce waste and associated greenhouse gas emissions and economic loss through product protection, preservation, and consumer education. In some cases, significant life cycle benefits have been achieved through innovative packaging designs. However, packaging also constitutes one-quarter of total municipal solid waste generated, much of which is disposed or can end up in waterways. The quantity and complexity of packaging in today's waste stream has outpaced traditional management methods. Therefore, discussions about reducing end-of-use impacts or increasing material recovery are complex. This is not only because of the diversity of packaging, the ever-increasing pace of packaging innovation, the role packaging plays in brand identification, and the number of industries and manufacturers involved, but also because of the complexity associated with balancing the many life cycle benefits packaging can provide.

Plastic packaging, for example, is typically sorted into one of seven or more resin types before the material is processed into industrial feedstock. However, while innovations such as full wrap labels, mixed-material packaging, or use of bioplastic "compostable" or "biodegradable" packaging may increase marketability or convenience, they may also cause problems in collection and recycling/composting systems that were not designed to process such items or materials. While bioplastics represent a small portion of plastics currently in use, the apparent expanding production of this packaging option warrants a better understanding of such materials and their manufacturing and environmental implications. More broadly, this includes the impacts of packaging design, market disruptions, "green" claims, and contamination of our recovery system. Concerted efforts by stakeholders all along the product chain are required for product innovation to occur with minimal disruptions to the state's established recycling and composting systems. This means packaging producers and brand owners need to work more closely with recyclers and the manufacturers using recovered materials. As part of this, producers also need to consider the end-of-life disposition of bioplastics in the context of the state's existing resource recovery framework and the recycling infrastructure necessary to achieve 75 percent. It will be challenging to achieve meaningful source reduction and recovery of fibers and resins on a statewide level without collaborative initiatives aimed at reducing the negative life cycle impacts associated with packaging. There is no one-size-fits-all solution.

Strategies:

- **Statewide Approach to Packaging**—Consider multiple options, including but not limited to statutory authority to establish a comprehensive, statewide packaging reduction and recycling program; support for voluntary approaches to packaging reduction and packaging; and variations thereof. Legislative provisions

might include but are not limited to extended producer responsibility and landfill bans. In addition, numerous voluntary industry and nongovernmental initiatives could suggest effective measures that could be included. **(Concept 28)**

- **Source Reduction**—Consider source reduction strategies such as voluntary industry and nongovernmental initiatives related to zero waste and alternatives to packaging in the statewide approach. **(Concepts 22, 23 and 28)**
- **Incentives for Manufacturers and Processors**—Increase direct financial assistance and indirect incentives for siting new or expanded manufacturing or processing facilities as well as equipment upgrades to process and manufacture new products with recovered resins and fibers. Funding could include dedicated Greenhouse Gas Reduction Fund revenue in addition to spending approval for FYs 2014/15 and 2015/16, and/or other existing and new sources of funding. **(Concepts 15 and 16)**
- **State Procurement**—Collaborate with the Department of General Services, goods providers, and end users to increase purchasing of post-consumer recycled content products and encourage green design in packaging. **(Concept 20)**
- **Mandatory Commercial Recycling**—Uncoated corrugated cardboard is an example of a product that can be recovered at higher rates through commercial recycling programs. Some local government programs and businesses have realized high diversion rates; these programs can be promoted to other local governments and businesses. **(Concepts 22, 25 and 26)**

Hazardous Materials

The toxicity or hazard of materials to the environment and to human health, including waste-handling workers, is also a consideration in identifying problematic waste. Human exposure to mercury, lead, and other hazardous substances contained in consumer electronics can result in neurological damage and cancer. In response, batteries, e-waste, fluorescent lamps, pharmaceuticals, sharps, universal waste, and used oil are some of the materials that have been banned from the landfill by the Legislature and the Department of Toxic Substances Control. Although toxic or hazardous materials represent less than 1 percent of the waste stream, the lack of convenient infrastructure for managing these materials and the high costs to local governments/general ratepayers, as well as issues related to illegal dumping and stockpiling in homes or offices, make these materials problematic.

Strategies:

- **Toxic Material Bans Coupled with Extended Producer Responsibility**—Consider single-product legislation or a smaller extended producer responsibility framework focused on products that are hazardous and banned from landfills, as long as the legislation includes the primary components of CalRecycle's extended producer responsibility framework. Opinions vary on which consumer products or materials should be phased out. **(Concept 21)**

- **Changes to E-Waste and Used Oil Recycling Programs**—Monitor and analyze the evolving e-waste stream to determine whether new approaches are needed to handle the influx of new technologies. A CalRecycle report to the Legislature, currently in progress, will provide recommendations for changes to the used oil program based on the life cycle assessment. **(Concepts 30 and 31)**
- **Technology Demonstrations**—Focus on market development of products from waste tires and/or used oil. **(Concept 29)**

3. Programmatic Effectiveness and Changes to Current Programs

Current programs have by any measure achieved significant success: a statewide diversion rate equivalent of 65 percent, a statewide recycling rate of 50 percent, and a beverage container recycling rate of 80 percent. CalRecycle manages programs that minimize the generation of waste (source reduction), maximize the diversion of materials from landfills, and direct materials to their highest and best use in accordance with the waste management hierarchy and reduction of greenhouse gases.

CalRecycle is responsible for oversight of the far-reaching effort envisioned by the Legislature in AB 341. The state plays a central role in facilitating the development of a sustainable materials economy and promoting ambitious recycling goals. Changes to current programs are, for the most part, summarized or reflected in the strategies outlined in earlier sections as well as in recommendations for legislative or regulatory change. Many program adjustments will focus on those economic sectors or populations in which the recovery of materials has been less effective or has plateaued, as has been the case with organics, commercial, multi-family, source reduction, and packaging.

Core Programmatic Activities Related to Strategies

CalRecycle continues to refine and develop existing programs as well as develop new initiatives and regulations in response to recent legislation. Many of these efforts set the stage for implementing the strategies and concepts outlined in this report. Just as important, CalRecycle enforces provisions of existing law in order to protect the health of California's environment and its people. Below is an alphabetical, bulleted listing of CalRecycle activities highlighting the concepts associated with ongoing work as well as tasks that continue as part of CalRecycle's regulatory responsibilities. A more detailed "Listing of Concepts" can be found in Appendix B.

<u>Certification/Registration</u>

- Beverage Container—recycling centers
- E-Waste **(Aspects of Concept 30)**
- Used Oil **(Aspects of Concept 31)**
- Minimum Content Requirements—various certification programs depending on product
- Waste Tire Haulers and Handlers—annual registration

Compliance Assistance and Training

- Beverage Container—recycling center reviews and inspections, processor load inspections, risk assessments, and data analysis
- Local Enforcement Agency evaluation
- Minimum Content Requirements—training and compliance reviews of manufacturers who use rigid plastic packaging containers for their products
- Solid Waste Facilities—oversight of permitted handling and disposal facilities, inspection frequency, and training **(Concepts 9 and 13)**
- Tire Facilities—oversight, inspections, and training **(Concept 13)**

Education and Public Outreach

- Behavior change campaigns, particularly related to recycling and source reduction **(Concepts 4 and 22)**
- K-12 education **(Concept 24)**
- Information and outreach, including social marketing and awards **(Concepts 4, 14 and 23)**

Enforcement—Local Partnerships/Grant Funding

- Local Enforcement Agencies (solid waste)—funding and training **(Concepts 18 and 19)**
- Tire Enforcement Agencies—funding and training **(Concepts 18 and 19)**

Enforcement and Fraud Prevention—State Level

- Beverage Container—reporting, recordkeeping, and operations; probationary reviews of recycling centers, annual recycling center inspections; processor load inspections, on-site investigations; collaboration with Department of Justice, Attorney General's Office, California Department of Food and Agriculture, and other state and local agencies
- E-Waste—reporting, recordkeeping, claim documentation, net cost reports, collaboration with Board of Equalization, Department of Toxic Substances Control, and Department of Justice to safeguard integrity of fund **(Aspects of Concept 30)**
- Extended Producer Responsibility (carpet, mattresses, and paint)—review and approval of stewardship plans and annual reports. Investigations and civil penalties as necessary.
- Extended Producer Responsibility—planning related to new materials. Additional resources also would be needed to implement a broad-reaching framework or add new materials **(Concept 21)**
- Local jurisdiction diversion program implementation—compliance reviews and direct enforcement

- Minimum Content Requirements—compliance certification
- Solid Waste Facilities—regular inspection of permitted handling and disposal facilities; enforcement as required **(Concept 9)**
- Waste Tire Storage/Disposal Facilities and Waste Tire Haulers/Handlers—regular inspection of facilities and enforcement as required. Collaboration with California Highway Patrol (surveillance), Department of Justice (investigation and prosecution), and Attorney General's Office (prosecution)

Engineering Support

- Closed, Abandoned, and Illegal Sites—inspection and investigation to ensure proper management
- Disaster Relief/Debris Removal—as needed for major projects
- Monitoring, Testing, Standard Development—particularly relative to development of biomethane standards, procurement standards, and engineering projects related to waste tires **(Concepts 5, 20 and 29)**
- Solid Waste or Tire Facility Cleanup or CalRecycle-Managed Remediation—project-by-project focus, which could include partnerships with state, local, or federal agencies

Financial Resources/Program Operations

- Grants—Ongoing grants include: Recycling Market Development Zone administrators; used oil programs, household hazardous waste, beverage container recycling, tire market development, solid waste facility/tire facility, or farm and ranch cleanup and remediation. Limited-term grants include organics infrastructure and facilities to process and remanufacture resins, glass and fiber from the Greenhouse Gas Reduction Fund **(Aspects of Concepts 4, 15, 16, 26, 29 and 31)**
- Program Payments (Beverage Container, Plastics, E-Waste, and Used Oil Collection)—review accuracy, completeness, and substantiation of claims
- Loans—Ongoing: Recycling Market Development Zone low-interest loans, coordination with other financing entities. Limited term: Greenhouse Gas Reduction Fund for organics management. **(Concepts 16 and aspects of 17)**

Local/State Government Assistance

- Diversion Program—SB 1016/AB 939 plans
- General Business Assistance **(Concept 17)**
- Household Hazardous Waste and Used Oil Program Development and Training
- State Agency Diversion Program

Permitting

- Infrastructure Development—organics and solid waste facilities **(Concepts 6, 7 and 8)**

- Regulatory Change: Organics and Solid Waste **(Concepts 3 and 7)**
- Cross-Media Regulatory Coordination **(Concepts 6 and 12)**
- Waste Tire Facilities

Research and Development

- Research (Basic and Applied) and Technology Transfer—including organics, tire-derived products such as tire-derived aggregate **(Aspects of Concept 29)**, and bioplastics **(Aspects of Concept 28)**
- Research and Demonstration Projects—often in collaboration with other state agencies **(Concepts 4, 20 and 29)**

Tracking and Reporting Systems

- Division of Recycling Integrated Information System (DORIIS)
- Facility Information Toolbox **(Aspects of Concept 10)**
- Disposal Reporting System **(Aspects of Concept 10)**
- State Agency Buy Recycled Campaign Purchasing and Reporting **(Aspects of Concept 20)**
- Solid Waste Information System
- Waste Tire Manifest and Waste Tire Management System

Appendix D summarizes 24 concepts for which CalRecycle is the lead, although several may also require statutory or regulatory change. CalRecycle activities have been clustered into four main categories for this table: analysis/research, education, grants, and work with other agencies (collaboration).

Changes to existing regulations are moving forward through informal and formal processes for beverage containers, tires, and organics. For example, CalRecycle has been working closely with stakeholders to draft language related to permitting and operational requirements for all types of in-vessel digestion activities, including anaerobic digestion; expanding the definition of food material; and determining when use of compostable material and compost is considered disposal.

Public/Private Partnerships

The dynamic evolution of how waste is managed in California, like so many other California success stories, is largely rooted in local innovation and adaptation. We are fully aware that statewide goals are achieved through local programs and private enterprise. Therefore, CalRecycle has forged a positive, productive partnership with both the public and private sectors. Indeed, this partnership has proven essential in managing an evolving waste infrastructure. An alliance of state and local governments; waste, recycling, and technology industries; environmental and public interest groups; and an engaged public is bringing true integrated waste management to California.

On the economic development side, stakeholders are providing input on how the Recycling Market Development Zone program could evolve. Closer relationships are being cultivated with the Governor's Office (GO-Biz) and local economic development agencies to facilitate assistance to manufacturers interested in expanding or developing new facilities in California. In another collaboration, CalRecycle, the Air Resource Board, and the Department of General Services have been working together to identify opportunities for increased recycled-content product purchasing. And, as noted above, CalRecycle has been provided budget authority on a limited term to use Greenhouse Gas Reduction Fund revenues.

As a result of the Waste Sector technical papers developed for the Air Resources Board's AB 32 Scoping Plan update, many of the recommendations in this report that also contribute to achieving greenhouse gas emission goals are already moving forward. Emission reduction factors are being examined or updated related to landfills, anaerobic and aerobic digestion, and recyclable materials from extended producer responsibility programs including carpet and paint. An interagency group was convened to move toward permit streamlining and another to address conflicting regulatory requirements. Benchmarks are being reviewed to ensure manufacturers have strong incentives to use recycled-content feedstock. Discussions continue about the potential use of Greenhouse Gas Reduction Fund revenues to support the development of new re-manufacturing, composting, and anaerobic digestion facilities in the state.

Supporting Innovation and Creativity

Success to date has also been built on core values and principles related to program development: foster innovation and creativity, acknowledge sound advancements in science and technology, and continually improve our efficiency and effectiveness. We strive to be strategic in our goal-setting and embrace change to ensure progress. Some key principles that will continue to guide program development include:

- Increasing Californians' confidence in new systems and technologies by ensuring a safe and well-operated/enforced infrastructure.
- Removing barriers to increasing the use of secondary materials in manufacturing.
- Collaborating and coordinating with other agencies and partners to demonstrate the interconnectedness of goals.
- Spurring local diffusion of innovation through demonstrations and partnerships.
- Building new programs based on successful models to jump-start continued innovation, reduce start-up time, and optimize cost effectiveness.
- Continually evaluating success and making adjustments—establishing goals and measuring outcomes.

Major research contracts were initiated or continued in 2013, including work focused on developing case studies/samples for local permitting decisions and funding strategies for local materials management programs (Institute for Local Government). Other current CalRecycle research focuses on analyzing and isolating volatile organic

compound emissions from compost piles; investigating the amount of greenhouse gases emitted by compost piles and whether application of finished compost on agricultural land can reduce nitrous oxide emissions from soils; and assessment of bio-plastics production and recovery.

Work was completed on the used oil life cycle assessment project; recommendations to increase oil collection and promote responsible management of used oil will be included in a report, currently in progress, slated to be delivered to the Legislature. In addition, CalRecycle initiated a contract to conduct a comprehensive statewide waste characterization study to update general information on materials still being disposed in landfills from all sources.

CalRecycle also established an internal working group to explore approaches to sustainable funding for state-level waste and materials management activities as an alternative to the state's current landfill disposal (tipping) fee. Using CalRecycle's Facility Information Toolbox, economic developers and other stakeholders can more easily access information about California's disposal, diversion, and recycling market infrastructure, including facility contacts, activities, material inputs and outputs, facility capacity, and facility throughput.

CalRecycle is also engaged in a variety of program activities concerning products and their impact on the environment. Several programs and initiatives encompass aspects of extended producer responsibility, including ongoing implementation and oversight of the carpet, paint, and mattress stewardship programs. CalRecycle actively participated in a national dialogue related to reduction of packaging and is planning workshops to further address packaging issues.

Increasing student and public environmental literacy continues as well. Feedback from teachers, administrators, philanthropists, and foundations has led to the formation of public-private partnerships to support the development of training, tools, and materials to facilitate implementation of the Education and the Environment Initiative curriculum in classrooms across California.

Success in reaching current recycling goals depended in part on an enlightened public who embraced new programs and changed their behavior. People need to know what to recycle, when to recycle, where to recycle and, most important, how to recycle. Effective recycling education programs explain, inform, motivate, persuade, and encourage people to recycle. Proposed outreach efforts will be informed by lessons from increased use of social media as well as behavior change efforts such as the successful "Check Your Number" campaign that encouraged oil change intervals according to manufacturer recommendations instead of the old—and often erroneous—standard of every 3,000 miles.

4. Changes for CalRecycle: Reprioritizing Existing Resources

For most of the recommendations included in this report, CalRecycle does not need new staff, although we may need to shift and refocus some personnel resources to

concentrate efforts on those activities where CalRecycle can make the most impact. This shift reflects the maturation of California's recycling infrastructure over the past 25 years and CalRecycle's flexibility in aligning with and seizing upon new initiatives and opportunities. Internally, reprioritizing may involve developing additional cross-divisional teams to minimize organizational change while creating new opportunities for partnership.

If additional funding is budgeted for new legislative initiatives, such as new grant and loan programs, some additional staffing would be needed. Additional resources also would be needed to implement a broad-reaching extended producer responsibility framework program or additional product-specific legislation, both for program development and for enforcement. In most other instances sufficient staffing exists, but the issue is lack of funding, authority, cross-agency collaboration/cooperation, and/or policy direction.

Sustainable Long-Term Funding

The importance of sustainable long-term funding for waste/materials management programs at state and local levels cannot be underestimated, as it provides the support necessary to reach 75 percent. Both CalRecycle and our partners in local government need sufficient resources to maintain day-to-day programs that provide the underpinnings of our health and safety, environmental protection, and market development programs.

CalRecycle receives no funding from the state General Fund. Our waste/materials management programs are supported by a combination of funding through tip fees charged for each ton of waste disposed at municipal landfills, and various material-specific fees on beverage containers, certain electronic products, lubricating oil, tires, and other materials. Extended producer responsibility programs for carpet, paint, and mattresses provide funding for certain CalRecycle activities related to enforcement. Disposal-related activities (such as alternative daily cover, alternative intermediate cover, beneficial reuse, and used tire-derived fuel), and nondisposal facilities (such as compost, anaerobic digestion, transfer stations, material recovery facilities, and transformation), are not subject to landfill disposal tip fees.

Historically, as disposal was increasing, funding was sufficient to provide services to meet CalRecycle's statutory mandates, and the tipping fee was adjusted to account for inflationary decreases in real value. Set in 1990 at 50 cents per ton, the fee was increased to $1.34 per ton in 1994 to meet increasing statutory obligations, not to exceed $1.40 per ton. Due to the slow economy and the eroding purchasing power of the fee due to inflationary decreases, that statutory cap of $1.40 was reached in July 2002.

CalRecycle is transitioning from a focused waste diversion strategy to a new, broad strategy focused on source reduction, recycling, and composting to achieve the 75 percent statewide recycling goal. In addition, CalRecycle maintains a decades-long

responsibility for the oversight of both active and closed facilities. As a result, a funding strategy based on tonnage disposal at landfills neither reflects the broader mission of CalRecycle nor provides adequate funding to achieve those goals.

As California moves toward 75 percent, the resulting reduction in waste disposal will cause a sharp decline in tipping fee revenue. Up slightly from the all-time low in 2012, 30 million tons of waste were disposed at permitted landfills in 2013 and thus subject to the tipping fee, and only 16 million tons are projected to be landfilled in 2020 under the 75 percent goal. That decline in tipping fee revenue would make it difficult to meet all of CalRecycle's statutory obligations. With landfills projected to play a diminishing role in materials/solid waste management, it is important that state and local program funding and assistance developing new diversion-related programs/facilities not be based on landfill fees.

A more robust state and local funding base will be needed to establish new initiatives to promote waste reduction and maintain critical functions, such as CalRecycle's and local enforcement agencies' ongoing regulatory oversight and fiduciary responsibilities over the multi-decade life of active and closed facilities. In addition, adequate revenue is required to provide new financial incentives, conduct research for regulatory and market development, support source reduction and education programs, facilitate cross-agency collaboration, and conduct waste characterization and other research.

At the state level, sustainable funding mechanisms might include a variety of options, including a tiered fee structure or a combination of disposal, service, and facility fees **(Concept 18)**. Such fees could include an administrative fee (applied for services such as permitting and inspection); a fee assessed on generators of solid waste; tipping/disposal fees for additional activities (including out-of-state disposal, transformation, tire-derived fuel, alternative daily cover, alternative intermediate cover, or beneficial use at landfills); advance fees for disposal, recycling or recovery; collector/transport fees; volume-based fees (including composting, recycling, and transformation facilities based on annual throughput, permitted capacity, or facility size); enforcement fines/penalties, and extended producer responsibility. Currently, CalRecycle does not have statutory authority to raise the disposal fee or apply it to additional activities or non-disposal facilities.

Considerations in the development of any sustainable funding mix include relatively low administrative costs and administrative simplicity, discouraging exportation of waste, encouraging environmentally preferable practices, and implementation of any measure in a manner that is economically sound and fair as the waste stream evolves. CalRecycle has authority to recover costs associated with closure/post closure plan review, but has never done so.

At the local level, the diversity of funding strategies used by local agencies to finance recycling, materials management, and enforcement programs provides models for use in other parts of the state **(Concept 19).** CalRecycle sponsored three workshops to explore these issues, and has a contract with the Institute for Local Government to

compile suggestions from stakeholders for new approaches to funding local programs, highlighting the opportunities and barriers of various funding methods.

The resources and case studies will be designed to provide city and county officials with information about assessing fees and managing rates related to collection, processing, and disposal of discarded material in the face of evolving programs. The Institute for Local Government will work closely with the League of California Cities, the California State Association of Counties, Rural County Representatives of California, and other local government organizations, as well as business organizations such as chambers of commerce and the Build Infrastructure Now coalition, to develop a portfolio of options to meet diverse local government needs.

Opportunity to Link with Other Initiatives

Environmental Justice, Public Health, and Environmental Protection

Integrating environmental justice principles and protecting public health, safety, and the environment are critical societal considerations in pursuing 75 percent. Despite best efforts, a large number of Californians live in the midst of multiple sources of pollution and some are more vulnerable to the effects of pollution than others. CalRecycle developed and prioritized the recommendations in this report in a manner that promotes equity and affords fair treatment, accessibility, and protection for all Californians, regardless of race, age, culture, income, or geographic location.

In developing and prioritizing its 75 percent recommendations, CalRecycle was mindful of measures that could disproportionately impact low-income communities most burdened by pollution. In particular, CalRecycle considered how to use a new science-based tool for evaluating multiple pollutants and stressors in communities, called the California Communities Environmental Health Screening Tool (CalEnviroScreen), which was developed by CalEPA through its Office of Environmental Health Hazard Assessment. CalEnviroScreen can provide information to establish priority areas for financial incentives as well as coordinated compliance and enforcement efforts. Knowing which areas of the state have higher relative environmental burdens helps with targeting resources and provides additional insight on the potential implications of proposed activities and decisions.

Notes are included in the concept lists (Appendices C and D) to describe how recommendations such as cross-media coordination, outreach, and grants and loans are incorporating environmental justice principles. In this manner, programs and funding can be targeted appropriately toward the most affected communities and balance our goals for waste reduction, economic growth, and protection of the health of California's people and environment.

Green Jobs

Recycling has long proven to be a job-creating activity and a valued contributor to California's economic and environmental strength. As part of developing the

recommendations for this report, CalRecycle reviewed prior jobs studies and, using current disposal tonnage and exports, forecast job creation as a result of recycling, composting, or source reducing the additional millions of tons of material required to meet 75 percent.

Implementing the recommendations related to collecting/processing material and manufacturing new products in California facilities could add as many as 100,000 or more new full-time and part-time jobs.

The largest job gains would be in processing and manufacturing for the paper, plastics, and inert materials sectors. If the manufacturing is done domestically, it would create 58,000 new jobs that would boost local and regional economies. While organic materials comprise one-third of total materials, they do not require as much secondary processing or remanufacturing to produce a final product. Still, this sector could account for more than 14,000 new jobs.

For each new job created, at least one additional job would also be created or induced indirectly. For example, the collection of recyclables creates secondary jobs because a new collection route requires a driver and possibly a specialized truck that must be manufactured, sold, and serviced.

Currently, processing and manufacturing sectors support 3 to 11 times as many jobs as collection and landfilling (inert materials and paper at the lower end, plastics and metals at the higher end). The average for current recycled materials collection and secondary processes is 5.3 jobs per 1,000 tons.

CalRecycle does not have complete data on all recycled-content manufacturers, but the collected data provides insight into manufacturing products with the potential to use recovered materials and the relatively low capacity of existing California facilities to take in large amounts of additional material.

California's organics processing infrastructure also faces many challenges, including competition with low landfill fees and difficulty in siting new facilities. Like recycled-content manufacturing, the overall capacity needed to handle increased tonnage of organic materials recycling will be insufficient; unlike other commodities such as paper and plastics, organics cannot easily be exported.

It is unlikely California would be able to absorb much of the increased tonnage of recycled materials exported each year, or the millions of additional tons that would be diverted from landfills to meet 75 percent, without substantial investment in new or expanded manufacturing plants and composting and anaerobic digestion facilities.

During the past two decades, recycling jobs have largely been created in countries in Asia, dominated by China, to which recyclable materials (glass, plastic, metals, paper, etc.) have been exported. For the near term, this means California will continue to rely on export markets to consume many of the state's recovered materials, particularly fibers and resins. However, some materials that are exported, such as textiles, might

benefit from domestic processing if facilities could be sited. In addition, 45 percent of the textile material being collected is re-sold as clothing and apparel, and programs to provide consistent, statewide collection can lead to the development of local small business jobs.

Greenhouse Gas Emission Reductions

The challenges of managing and effectively utilizing California's resources, including waste materials, are diverse and interconnected. As part of AB 32, CalRecycle is working closely with the Air Resources Board to recommend waste management strategies that also reduce the production of greenhouse gases. The 2008 Scoping Plan began the process of identifying opportunities for greenhouse gas emission reductions from the waste sector, including the need for mandated commercial recycling, expanded organics infrastructure, extended producer responsibility, and other alternatives to landfilling.

Control of landfill methane emissions was identified as an early action measure, and regulations addressing this issue were adopted. In addition to methane emissions, the Air Resources Board directed its staff to work closely with CalRecycle to develop recommendations that would impact how quickly we achieve greenhouse gas emissions and waste reduction goals. In addition, the Air Resources Board directed staff to propose a comprehensive approach for the waste sector with respect to the Greenhouse Gas Reduction Fund based upon the analysis of emission reduction opportunities.

CalRecycle continues to work closely with the Air Resources Board on the Waste Sector Plan. Work to date has entailed co-development of six technical papers and an implementation plan (http://www.calrecycle.ca.gov/Actions/PublicNoticeDetail.aspx?id=1025&aiid=935) along with several workshops to solicit stakeholder comment. Preliminary estimates show that achieving 75 percent will result in an estimated reduction of 20 million to 30 million metric tons of carbon dioxide-equivalent emission in 2020. To accomplish this, the draft Waste Sector Plan also acknowledges that meeting waste reduction and greenhouse gas emissions goals must be addressed with the understanding that California must take ownership for the waste generated within our borders.

Following the Scoping Plan, the Air Resources Board is developing a plan targeting the release of short-lived climate pollutants (SLCPs), including methane. Landfills are responsible for roughly 20 percent of methane emissions in the state, and CalRecycle is working closely with ARB to identify additional strategies beyond those outlined in the Scoping Plan to reduce these emissions. As a precursor to the SLCP plan, ARB has released a concept paper that proposes a goal of diverting 90 percent of organics from landfills by 2025, intended to "effectively eliminate the disposal of organic materials in landfills in California … by the middle of the next decade."

As noted in CalRecycle's study on potential new recycling jobs in California as a result of this report's recommendations, exporting waste denies California the economic opportunity of significant job growth that would result if these materials were remanufactured in California. Decisions addressing these issues will directly impact how, and how quickly, we achieve greenhouse gas emission and waste reduction goals.

Appendices

A. Stakeholder Feedback and Report Development

B. Listing of Concepts

C. Summary of Concepts Requiring Statutory or Regulatory Change

D. Summary of Concepts Requiring Administrative Changes: CalRecycle Lead

E. The Numbers: What Does 75 Percent Mean?

Appendix A: Stakeholder Feedback and Report Development

To engage stakeholders in the development of the strategies to achieve 75 percent, CalRecycle developed a discussion document in May 2012 (www.calrecycle.ca.gov/75Percent/Plan.pdf) in advance of public workshops in both Northern and Southern California. The draft served as a conversation starter to organize the existing efforts and new ideas into 10 focus areas based on broad social, economic, and environmental policy drivers.

To provide further transparency and ongoing opportunities for input, CalRecycle created several webpages for the 75 percent initiative. The main webpage (http://www.calrecycle.ca.gov/75Percent/) includes links to past and upcoming workshops, background documents, stakeholder letters, staff contacts, and an overview of the report development process. A second page (http://www.calrecycle.ca.gov/75Percent/FocusAreas/default.htm) is organized topically by focus areas to enable stakeholders to more easily follow interest areas such as organic materials management or local funding strategies. It includes descriptions of each proposed concept excerpted from the discussion draft as well as links for related staff activities and public workshops related to those concepts.

An update was published in October 2013 (http://www.calrecycle.ca.gov/75Percent/UpdateOct13.pdf) to reflect stakeholder feedback and ongoing staff work. As part of the report development process, CalRecycle engaged stakeholders in dialogue through a series of public workshops and a web-based survey of the draft concepts. In addition, a listserv was created to advise interested parties of workshops/webinars on programmatic and regulatory changes (including those related to material recovery facility standards, composting regulations, and others).

Stakeholder comments, including both the online survey and letters to the CalRecycle director, represented a wide spectrum of interests. Approximately one-third of feedback came from the solid waste industry, and another one-third from local governments. Comments were also received from associations (non-solid waste industry), other businesses/utilities, consultants, and environmental groups. The online survey responses reflected stakeholder opinions on the importance of the concepts as well as suggested adjustments. Stakeholders were asked if concepts were critical, somewhat critical, or irrelevant. Although not everyone rated the concepts, patterns did emerge.

As a result of stakeholder and staff input, as well as programmatic developments, the initial list of strategies was refined. It was challenging to separate some of the concepts from each other as they are so integrally related. Some concepts were expanded, combining as many as five original concepts. The majority were refined to reflect multifaceted approaches and integrate elements from various concepts. Some concepts that initially stood alone were integrated into broader concepts. Two new concepts were

local waste/materials management program funding mechanisms and K-12 environmental education.

Appendix B: Listing of Concepts

Within the organizing structure of the strategies, 31 concepts are listed in the table below along with the type of action recommended to reach 75 percent. The concepts represent a snapshot in time and include programs that are currently being implemented, as well as potential refinements or new approaches to tackle problematic waste streams.

Many of these concepts are familiar since they call for extensions of existing programs. Some involve ongoing cooperative efforts with other agencies, and others require authorizing legislation or regulatory changes. Three-fourths of the concepts (24) position CalRecycle with lead responsibility, or a support role, to move the state forward (Appendix D). One-third of the concepts (12) require statutory or regulatory change (Appendix C).

For reference throughout this report, the left-hand column numbers each concept. If the recommendation requires statutory or regulatory change, that is noted in the third column. If CalRecycle is the lead, and administrative action is recommended, general activities related to implementing the concept are described, including analysis/research, education, enforcement, grants, and work with other agencies (collaboration).

CalRecycle core programmatic activities are described in this report in the section titled "Core Programmatic Activities Related to Strategies." Ongoing work as well as tasks that continue as part of CalRecycle's regulatory responsibilities are included in the bulleted listing below. In addition, Appendices C and D include notes and highlights from current activities for each concept.

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships
	Moving Organics Out of the Landfill		
1	Phase out organics disposal at landfills and redirect into composting, anaerobic digestion, and other organics recycling facilities.	Statutory	
2	Remove incentives (diversion credit/add tipping fee) for use of green waste alternative daily cover at landfills and re-direct green waste material to composting, anaerobic digestion, and other organics recycling facilities.	Statutory	

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships
3	Adopt regulatory changes to increase the likelihood that organics will be composted or beneficially used while providing the appropriate level of regulatory oversight.	Regulatory	
4	Support organic materials recycling and food waste prevention programs through increased collaboration and promotion of effective local programs and development of a grant program.		Education
5	Work closely with California Public Utilities Commission to develop policies and programs that promote in-state production, distribution, and use of biomethane from landfills and anaerobic digestion facilities.		Work with Other Agencies
	Expanding Recycling/Manufacturing Infrastructure: Permitting and Compliance Assistance		
6	Collaborate with other regulatory agencies to streamline the permitting process and resolve conflicting permitting requirements in order to reduce the time, complexity, and cost to obtain a compost, anaerobic digestion, or related permit.		Work with Other Agencies
7	Continue to adjust solid waste and recycling facility regulations to ensure they are grounded in current science, address market conditions and changes in waste streams, facilitate permit streamlining, and take advantage of emerging technologies.	Regulatory	
8	Develop statewide tools and inter-agency relationships to streamline local facility siting/expansion to handle the increase in materials diverted from disposal.		Work with Other Agencies
9	Expand periodic inspections to include a more representative sample of all types of solid waste facilities/operations instead of focusing primarily on landfills.	Statutory	Enforcement

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships
10	Require recycling and composting facilities to submit reports on solid waste and material flows through their facilities.	Regulatory	
11	Develop a technology-neutral standard for post-recycled residuals that promotes removal of a sufficient amount of recyclables before residuals are used for energy recovery.		Research and Analysis
12	Establish a consistent, cross-media procedure for evaluating the beneficial use of solid waste, including as a feedstock for waste-to-energy.		Work with Other Agencies
13	Promote consistent facility operator training and/or certification to ensure facilities can be operated in compliance.		Education
14	Develop a fully integrated communications plan that can be tailored to specific regions and highlight the positive economic and environmental aspects of siting recycling and manufacturing infrastructure.		Education
	Expanding Recycling/Manufacturing Infrastructure: Financing		
15	Develop financial incentives to support new and expanded infrastructure for manufacturing (for recycled materials feedstock), processing, and energy/biofuels generation.	Statutory (for some)	Work with Other Agencies
16	Provide loans and grants statewide to develop and expand manufacturing infrastructure (for recycled materials feedstock).		Grants and Loans
17	Increase CalRecycle's ability to respond to manufacturers' and processors' business assistance needs (e.g. attraction, retention and expansion, site selection, permit assistance) by enhancing existing programs and leveraging other business-related organizations.		Work with Other Agencies

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships
	Exploring New Approaches for State and Local Funding of Sustainable Waste Management Programs		
18	Explore approaches to establish a sustainable funding source for CalRecycle's waste/materials management activities.	Statutory	
19	Work closely with local jurisdictions and related associations to identify new funding mechanisms for local waste/materials management programs and activities that are independent from landfill disposal fees.		Work with Other Agencies
	Promoting State Procurement of Post-Consumer Recycled Content Product		
20	Collaborate with the Department of General Services and delegated state purchasing entities to increase purchases of post-consumer recycled-content products.		Work with Other Agencies
	Promoting Extended Producer Responsibility		
21	Continue to refine an extended producer responsibility framework that establishes a process for CalRecycle to select products, set goals, and continually improve its approach by incorporating changes and modifications resulting from existing programs.	Statutory	
	Source Reduction		
22	Develop a "zero waste" page on the CalRecycle website to promote local jurisdiction and private sector zero waste activities through model programs, case studies, and other information.		Education
23	Partner with awards programs to recognize businesses that meet waste management and environmental goals.		Work with Other Agencies
24	Leverage partnerships to promote the use of K-12 model environmental curriculum to cultivate environmental literacy for students statewide.		Work with Other Agencies

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships
	Commercial Recycling		
25	Evaluate effectiveness of current requirements for commercial recycling before considering changes to thresholds or enforcement.		Research and Analysis
26	Provide grants to support and encourage recycling at multifamily complexes.		Grants (Greenhouse Gas Reduction Fund)
27	Work with the Building Standards Commission, the Department of Housing and Community Development, and other code writing agencies to enhance and expand CALGreen's provisions related to waste management and the use of recycled-content products.		Work with Other Agencies
	Other Products		
28	Pursue statutory authority to establish a comprehensive, statewide packaging reduction and recycling program.	Statutory	Work with Other Agencies, Research and Analysis
29	Refine and explore new programs and policies to increase diversion of tires from landfills and create markets for products made from waste tires.		Work with Other Agencies
30	Monitor and analyze the impacts of the evolving character of covered electronic waste and how the current recycling program model handles the influx of new technologies, to determine whether alternative approaches are needed.	Statutory	Enforcement, Research and Analysis
31	Consider statutory, regulatory, and/or administrative changes to the Used Oil Program based on recommendations in the Used Oil Lifecycle Assessment report.	Statutory	Research and Analysis

Appendix C: Summary of Concepts Requiring Statutory or Regulatory Change

AB 341, pursuant to PRC Section 41780.02(b)(3-4), requires that CalRecycle submit a report to the Legislature that includes recommendations for legislative and regulatory changes that would be necessary to achieve 75 percent. The narrative discussion is included in the report section titled "Legislative and Regulatory Recommendations," which includes reference numbers for each of those concepts.

The table below summarizes 12 concepts that require statutory or regulatory change. These represent one third of the strategies recommended. Several concepts also include a supporting role for CalRecycle in either enforcement, analysis/research, or collaboration with other agencies, as noted in Appendix D. The final column provides notes and highlights from current activities for each concept.

#	Concept Description	Statutory or Regulatory Change Needed	Notes and Current Activities
	Moving Organics Out of the Landfill		
1	Phase out organics disposal at landfills and redirect into composting, anaerobic digestion, and other organics recycling facilities.	Statutory	Alternative to legislation is potential for direct regulation to phase organics out of landfills, which is included in the Waste Sector component of the Air Resources Board Scoping Plan.
2	Remove incentives (diversion credit/add tipping fee) for use of green waste alternative daily cover at landfills and redirect green waste material to composting, anaerobic digestion, and other organic recycling facilities.	Statutory	Legislative options include assessing a landfill disposal (tipping fee) on green waste alternate daily cover and eliminating alternative daily cover as a diversion credit. An alternative to legislation is potential for direct regulation by the Air Resources Board to phase organics out of landfills, which is included in the Waste Sector component of the Air Resources Board Scoping Plan; no timeline is specified.

#	Concept Description	Statutory or Regulatory Change Needed	Notes and Current Activities
3	Adopt regulatory changes to increase the likelihood that organics will be composted or beneficially used while providing the appropriate level of regulatory oversight.	Regulatory	Included in Waste Sector component of Air Resources Board Scoping Plan; existing regulatory activity moving from informal to formal process. Note broader regulatory changes are addressed in **Concept 7**.
	Expanding Recycling/Manufacturing Infrastructure: Permitting and Compliance Assistance		
7	Continue to adjust solid waste and recycling facility regulations to ensure they are grounded in current science, address market conditions and changes in waste streams, facilitate permit streamlining, and take advantage of emerging technologies.	Regulatory	As regulations are adjusted, staff will develop guidance or tools such as program environmental impact reports to facilitate implementation. As language is drafted, stakeholder comments related to changes in collection frequency and changes to promote collection efficiency/quality would be considered. Note that regulatory changes related to organics are detailed separately in **Concept 3**.
9	Expand periodic inspections to include a more representative sample of all types of solid waste facilities/operations instead of focusing primarily on landfills.	Statutory	Significantly increasing the number of non-landfills inspected would require statutory change or additional funds for inspecting more facilities.
10	Require that recycling and composting facilities submit reports on solid waste and material flows through their facilities.	Regulatory	Depending on how it is implemented, recycling and compost facilities could submit reports to the counties or directly to CalRecycle through an online reporting system. CalRecycle would make data available to counties as soon as it is reported. Tracking material flows for beverage containers is facilitated by DORIIS.

#	Concept Description	Statutory or Regulatory Change Needed	Notes and Current Activities
	Expanding Recycling/Manufacturing Infrastructure: Financing		
15	Develop financial incentives to support new and expanded infrastructure for manufacturing (from recycled materials feedstock), processing, and energy/biofuels generation.	Statutory (for some)	Potential funding sources include tipping fee, Greenhouse Gas Reduction Fund, AB 118 (via California Energy Commission), tax credits, Beverage Container Recycling Fund, pollution control financing, equipment retrofits, etc. These types of options are consistent with those included in the Waste Sector component of the Air Resources Board Scoping Plan Update. Greenhouse Gas Reduction Fund funding for CalRecycle grants and loan programs is authorized by the 2014/15 Budget Act **(Concepts 4 and 16)**.
	Exploring New Approaches for State and Local Funding of Sustainable Waste Management Programs		
18	Explore approaches to establish a sustainable funding source for CalRecycle's waste/materials management activities.	Statutory	An internal working group has been established to research sustainable funding approaches.
	Promoting Extended Producer Responsibility		
21	Continue to refine the extended producer responsibility framework that establishes a process for CalRecycle to select products/set goals and continually improve by incorporating changes and	Statutory	In lieu of the full framework approach, review single-product legislation or a smaller framework focused on products that are hazardous and banned from landfills, as long as the legislation includes the primary

#	Concept Description	Statutory or Regulatory Change Needed	Notes and Current Activities
	modifications resulting from existing programs.		components of CalRecycle's extended producer responsibility framework.
	Other Products		
28	Pursue statutory authority to establish a comprehensive, statewide packaging reduction and recycling program.	Statutory	CalRecycle held workshops in 2013 and 2014 on packaging issues and plans to hold another in November 2015. Potential strategies to be discussed include, but are not limited to, extended producer responsibility, landfill bans, economic incentives, voluntary programs, or a combination of these. CalRecycle is collaborating with U.S. EPA on packaging workshops.
30	Monitor and analyze the impacts of the evolving character of covered electronic waste and how the current recycling program model handles the influx of new technologies, to determine whether alternative approaches are needed.	Statutory	Industry net costs assessed annually; increased recycling payment rate approved in June 2014 and effective July 2014; ongoing collaboration with Department of Toxic Substances Control and stakeholders. CalRecycle held workshops and late 2014 and early 2015 on market and technology trends, alternative models, etc.; more workshops are planned.
31	Consider statutory, regulatory, and/or administrative changes to the Used Oil Program based on recommendations in the Used Oil Lifecycle Assessment report.	Statutory	Report to the Legislature as part of SB 546 (Lowenthal, Chapter 4, Statutes of 2009).

Appendix D: Summary of Concepts Requiring Administrative Changes: CalRecycle Lead

CalRecycle manages programs that minimize the generation of waste (source reduction), maximize the diversion of materials from landfills, and direct materials to their highest and best use in accordance with the waste management hierarchy and reduction of greenhouse gasses. Appendix D summarizes 24 concepts for which CalRecycle is the lead, although several recommendations may also require statutory or regulatory change.

Three-fourths of the concepts included in the strategies to achieve the statewide 75 percent goal position CalRecycle with lead responsibility or a key role to move the state forward. In particular, program adjustments will focus on those economic sectors or populations where the recovery of materials has been less effective or has plateaued, as has been the case with the organics, commercial, multi-family, source reduction, and packaging.

CalRecycle activities have been clustered into four main categories for this table: analysis/research, education, grants, and work with other agencies (collaboration). Several concepts require statutory or regulatory change as noted in the third column to be fully realized. In addition, notes and highlights from current activities are included for each concept.

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships	Notes and Current Activities
	Moving Organics Out of the Landfill			
4	Support organic materials recycling and food waste prevention programs through increased collaboration and promotion of effective local programs and development of a grant program.		Education	CalRecycle has received spending authority for an organics grant program using Greenhouse Gas Reduction Fund funding of $15 million and additional loan funding of $5 million for FYs 2014/15 and 2015/16; CalRecycle awarded the first grants in October 2014. Expand work with food generators, local governments, industry, state agencies, and other entities to increase food waste

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships	Notes and Current Activities
				prevention, collection, and recycling programs; currently working with Department of Corrections and Rehabilitation on implementing master services agreement for prison food waste collection. Develop additional food recovery models and tools on the CalRecycle website. Continue to address packaging to facilitate improved food waste collection and more efficient organics processing; workshop on packaging issues tentatively scheduled for late 2014.
	Expanding Recycling/Manufacturing Infrastructure: Permitting and Compliance Assistance			
6	Collaborate with other regulatory agencies to streamline the permitting process and resolve conflicting permitting requirements in order to reduce the time, complexity, and cost to obtain a compost, anaerobic digestion, or similar permit.		Work with other agencies	Consistent with recommendations in the Waste Sector component of the Air Resources Board Scoping Plan, CalRecycle is coordinating with the ARB on a working group established with California Air Pollution Control Officers Association to examine air quality-related issues.

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships	Notes and Current Activities
8	Develop statewide tools and inter-agency relationships to streamline local facility siting/expansion to handle the increase in materials diverted from disposal.		Work with other agencies	While state involvement in local siting is minimal, CalRecycle has contracted to provide case studies, samples, and strategies for local governments to use in considering the siting of new facilities; initial workshops/webinars were held in late 2014 and early 2015. CalRecycle is also collaborating with other agencies to streamline permitting, which is related to this concept.
9	Expand periodic inspections to include a more representative sample of all types of solid waste facilities/operations instead of focusing primarily on landfills.	Statutory	Enforcement	Significantly increasing number of non-landfills inspected would require statutory change or additional funds for inspecting more facilities.
11	Develop a technology-neutral standard for post-recycled residuals that promotes removal of a sufficient amount of recyclables before residuals are used for energy recovery.		Research and Analysis	CalRecycle is working closely with the Governor's Office, Air Resources Board, and California Energy Commission.
12	Establish a consistent, cross-media procedure for evaluating the beneficial use of solid waste, including as a feedstock for waste-to-energy.		Work with other agencies	Examples include use of combustion ash in road base or working with the California Department of Food and Agriculture to establish protocols for land application of green material; a cross-agency working group was established by

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships	Notes and Current Activities
				the Air Resources Board to examine issues related to air quality.
13	Promote consistent facility operator training and/or certification to ensure facilities can be operated in compliance.		Education	Training programs are offered directly by CalRecycle or in partnership with other training programs.
14	Develop a fully integrated communications plan that can be tailored to specific regions and highlight the positive economic and environmental aspects of siting recycling and manufacturing infrastructure.		Education	Where appropriate, CalRecycle is incorporating 75 percent and the corresponding infrastructure needs into general messaging, e.g. speeches, articles, reports, media interviews, news releases, and social media.
	Expanding Recycling/Manufacturing Infrastructure: Financing			
15	Develop financial incentives to support new and expanded infrastructure for manufacturing (from recycled materials feedstock), processing, and energy/biofuels generation.	Statutory (for some)	Work with Other Agencies	Potential funding sources include tipping fee, Greenhouse Gas Reduction Fund, AB 118 (via California Energy Commission), tax credits, beverage container recycling fund, pollution control financing, equipment retrofits, etc. These types of options are consistent with those included in the Waste Sector component of the Air Resources Board Scoping Plan Update. Greenhouse Gas Reduction Fund funding for CalRecycle grants and loan programs is authorized in the 2014/15 budget **(Concepts 4 and 16)**.

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships	Notes and Current Activities
16	Provide loans and grants statewide to develop and expand manufacturing infrastructure (from recycled materials feedstock).		Grants and Loans	2014/15 Budget Act authorized organics grant, recycling commodities grant, and revolving loan programs using Greenhouse Gas Reduction Fund funding of $25 million; CalRecycle anticipates awarding organics grants in October 2014. Funding loans outside the RMDZ is enabled by this Greenhouse Gas Reduction Fund funding.
17	Increase CalRecycle's ability to respond to manufacturers' and processors' business assistance needs (e.g. attraction, retention and expansion, site selection, permit assistance) by enhancing existing programs and leveraging other business-related organizations.		Work with Other Agencies	New services are being added and partnerships formed, including increased coordination with Go-BIZ and local, regional, and/or statewide economic development programs. Supports loans/grants recommended in **Concept 16**.
	Exploring New Models for State and Local Funding of Materials Management Programs			
19	Work closely with local jurisdictions and related associations to identify new funding mechanisms for local waste/materials management programs		Work with Other Agencies	CalRecycle has a contract to provide case studies, samples, and strategies for local governments to use in considering funding of local programs and infrastructure. Note: Funding for

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships	Notes and Current Activities
	and activities that are independent from landfill disposal fees.			infrastructure (vs. waste or materials management programs) is covered in **Concept 15**.
	Promoting State Procurement of Post-Consumer Recycled Content Product			
20	Collaborate with the Department of General Services and delegated state purchasing entities to increase purchases of post-consumer recycled-content (PCRC) products.		Work with other agencies	A procurement technical paper addressing these concepts is included in the Waste Sector component of the Air Resources Board Scoping Plan. Strategies could also include environmental certification that includes credit/priority for products with take-back programs and demonstration projects such as with CalTrans on tire-derived products.
	Source Reduction			
22	Develop a "zero waste" page on the CalRecycle website to promote local jurisdiction and private-sector zero waste activities through model programs, case studies, and other information.		Education	Currently identifying existing zero waste content on CalRecycle's website to develop a zero waste portal page. Many existing pages contain model programs and case studies.
23	Partner with awards programs to recognize businesses that meet waste management and environmental goals.		Work with Other Agencies	CalRecycle will no longer implement its Waste Reduction Awards Program. Other awards programs that CalRecycle will partner with include the Governor's Environmental and Economic Leadership

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships	Notes and Current Activities
				Award, Cool California, Arrow Awards, and Green Business Certification. CalRecycle is also a sponsor of the U.S. Zero Waste Business Council.
24	Leverage partnerships to promote the use of K-12 model environmental curriculum to cultivate environmental literacy for students statewide.		Work with Other Agencies	Feedback from teachers, administrators, philanthropists, and foundations has led to the formation of public private partnerships to support the development of training, tools, and materials to facilitate implementation of the EEI curriculum in classrooms across California.
	Commercial Recycling			
25	Evaluate effectiveness of current requirements for commercial recycling before considering changes to thresholds or enforcement.		Research and Analysis	Data for evaluating initial effectiveness of commercial recycling will be obtained from Waste Characterization Study to be completed in 2015/16, pursuant to measures adopted in the Air Resources Board Scoping Plan.
26	Provide grants to support and encourage recycling at multifamily complexes.		Grants (Greenhouse Gas Reduction Fund)	Future Greenhouse Gas Reduction Fund funding could be expanded to include complex owners or associations, nonprofits, waste haulers, jurisdictions, etc. Eligible activities might include

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				outreach, education, technical assistance, equipment, hauling costs, and enforcement.
27	Work with the Building Standards Commission, the Department of Housing and Community Development, and other code writing agencies to enhance and expand CALGreen's provisions related to waste management and the use of recycled content products.		Work with Other Agencies	Enhancements could include expanding deconstruction and salvage provisions, collaborating with local jurisdictions to develop programs, and using the existing AB 939 review process to ensure jurisdictions are enforcing their mandatory CALGreen provisions and/or construction and demolition ordinances (whichever is more stringent). Work on the next cycle will begin in 2015, with an effective target date of 2017.

#	Concept Description	Statutory or Regulatory Change Needed	CalRecycle Activities and Partnerships	Notes and Current Activities
	Other Products			
28	Pursue statutory authority to establish a comprehensive, statewide packaging reduction and recycling program.	Statutory	Work with Other Agencies, Research and Analysis	CalRecycle held workshops in 2013 and 2014 on packaging issues and plans to hold another in November 2015. Potential strategies to be discussed include, but are not limited to, extended producer responsibility, landfill bans, economic incentives, voluntary actions, or a combination of these. CalRecycle is also collaborating with the U.S. EPA on packaging workshops.
29	Refine and explore new programs and policies to increase diversion of tires from landfills and create markets for products made from waste tires.		Work with Other Agencies	A broad set of activities is detailed in the Five-Year Tire Plan. The new Tire Incentive Payment Program was implemented in 2014, with first awards approved in June 2014. The Five-Year Tire Plan was published in July 2015.
30	Monitor and analyze the impacts of the evolving character of covered electronic waste (CEW), and how the current CEW recycling program model handles the influx of new technologies, to determine whether alternative approaches are needed.	Statutory	Enforcement Research and Analysis	Industry net costs are assessed annually; an increased recycling payment rate was approved in June 2014 and effective July 2014; collaboration with Department of Toxic Substances Control and stakeholders is ongoing. CalRecycle held workshops in late 2014 and early 2015, and more workshops are planned.

31	Consider statutory, regulatory, and/or administrative changes to the Used Oil Program based on recommendations in the Used Oil Lifecycle Assessment report.	Statutory	Research and Analysis	Report to the Legislature as part of SB 546 (Lowenthal, Chapter 4, Statutes of 2009).

Appendix E: The Numbers: What Does 75 Percent Mean?

Changes in How We "Count" for the Purpose of the Report

The strategies recommended in this report do not establish or enforce a diversion rate on a city or county that is greater than the mandated 50 percent.

CalRecycle wanted a measurement system for tracking progress in meeting the statewide goal that was:

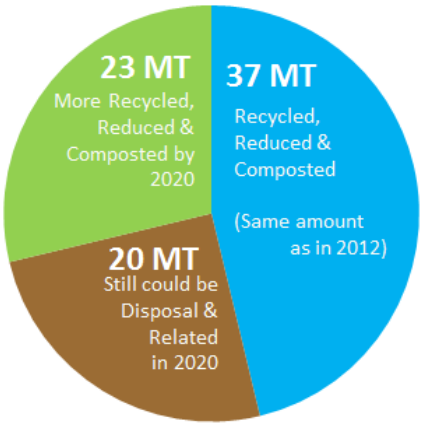
- Consistent with statute and CalRecycle policy.
- Simple to track and calculate.
- Distinct from diversion measurement for 50 percent diversion mandate for local compliance.
- Reflective of the ambitious stance of the law.

We selected the baseline of 10.7 pounds of waste generated per person per day against which to measure the statewide recycling rate because it represents the long-term average (1990 through 2010) and was the median for that 21-year period. This is a lower generation rate than the 12.6 pounds/resident/day specified by statute (AB 939, Sher, Chapter 1095, Statutes of 1989) to measure local diversion (2003-2006 average). However, that baseline reflected years that were nearly at the peak of historical generation driven by a burst in economic activity uncharacteristic of long-term trends. In addition, 10.7 pounds was the per capita generation in 2000, the first year jurisdictions were mandated to be at 50 percent diversion—an appropriate year to begin this next phase of increasing recycling in California.

The "Recycling" Target: 8 Pounds/Person/Day

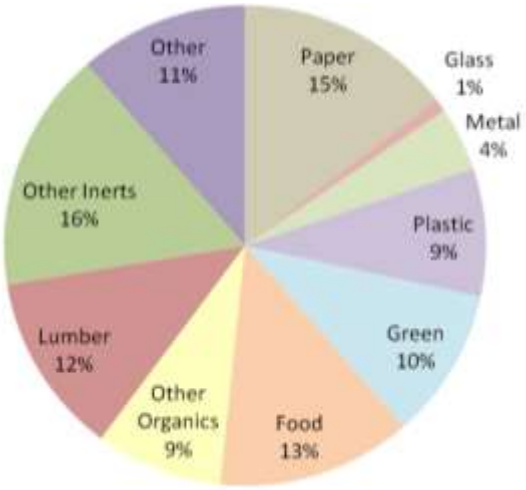
To reach the 75 percent goal, each Californian must reduce/recycle/compost an equivalent of 8 pounds per day and dispose no more than 2.7 pounds/person/day (25 percent). (This target was calculated using the base noted above of 10.7 pounds of waste generation per person per day). Because "recycling" activities are more diffuse, varied, and difficult to measure, goal attainment will focus on the relatively small number of disposal-related activities. These activities tend to be more regulated, more concentrated, and more accurately measured.

Californians will generate about 80 million tons of solid waste in 2020, according to CalRecycle projections. Reaching 75 percent means approximately 60 million tons—or eight pounds/person/day—will need to be reduced, recycled, or composted in 2020. We assume that current source reduction, recycling, and composting efforts will continue to account for at least the same tonnage as in 2013—about 37 million tons. That means an additional 23 million more tons will need to be recycled, reduced or composted in 2020 to meet the statewide goal. The remaining 20 million tons would still go to disposal and disposal-related activities (alternative daily cover, alternative intermediate cover, beneficial reuse, transformation, etc.).



2020 Waste Disposal/Diversion Projection

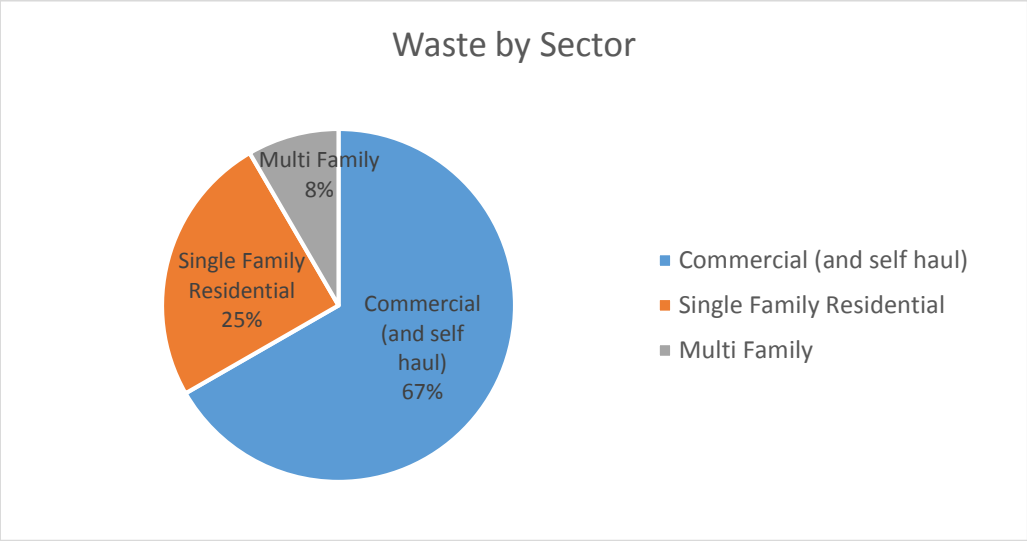
The largest segments of the disposed waste stream are an obvious place to begin as California develops new recycling, processing, composting, and manufacturing facilities. Organics (food, green waste, lumber, and other organics) is the largest waste stream, followed by other inerts and then paper. The two most prevalent materials in both the overall disposed waste stream and organics segment are food and lumber (including dimensional lumber, engineered wood, pallets, and crates). These larger and problematic waste streams are described in more detail in the report section titled "Problematic Waste Streams," which includes strategies to reach 75 percent.



Landfill Waste Disposal: 2013

The commercial sector, including self-haul from businesses, contractors, landscapers, etc., accounts for two-thirds of the waste generated; the residential sector, including self-haul, for one quarter; and the remaining 8 percent is multi-family residential. Although the percentages for each material vary by sector, the top two remain the same

for both the commercial and residential sectors. Building on past success, business types with the highest diversion rates did so mainly by implementing effective recycling programs for cardboard and other packaging—diverting on average more than 60 percent.



While the sheer volume of material is substantial, cross-contamination of recycling streams increases the challenge. Successful recycling requires separation and cleaning of materials before they are shipped to manufacturers. Yet the introduction of incompatible materials sometimes makes it difficult to meet commodity specifications and leads to processing "yield loss" that ends up in landfills. On the plus side, according to CalRecycle field research in 2008, nearly two-thirds of commonly recycled types of paper, plastic, and metals found in disposed waste going to disposal facilities were clean and could be expected to be recycled without special processing through programs targeting those materials.

Tracking the Full Range of Activities

California cannot effectively manage what it cannot measure. We need more comprehensive tracking mechanisms to measure how much material is really being recycled and composted. CalRecycle's Disposal Reporting System tracks landfill disposal, transformation, and alternate daily cover. These amounts are considered disposal or disposal-related and will be used to determine progress toward the statewide goal. CalRecycle has limited statutory authority to require some "diversion reporting" from recycling and composting facilities (PRC Section 41821.5(b)), but has no corresponding enforcement authority to obtain the data, much of which is considered confidential business information that would have to be voluntarily provided but historically has not been. To compel such reporting would require the development and

approval of regulations, and to ensure proper reporting CalRecycle would need statutory enforcement authority **(Concept 10)**. Such data will be critical as a double-check to track where recovered materials from disposal-related activities are actually flowing and document whether materials are being managed in a manner that increases recycling, manufacturing with recycled content, and composting. In addition, CalRecycle might consider a system similar to Oregon's that requires material brokers to account for recycling. However, these systems do not verify whether recovered materials that are exported are utilized as feedstock to manufacture new products.

As accounting systems are improved, there must also be an emphasis on accuracy of data as well as accountability for the information. The statutory authority for both disposal reporting and diversion reporting lacks any enforcement mechanisms and does not impose penalties for failing to report or for misreporting. If disposal reporting drops below its current moderate level, or entities fail to report in a new diversion reporting system, then CalRecycle may request explicit statutory authority for enforcement mechanisms and monetary penalties.

There are other quantitative and qualitative indicators against which we can measure progress such as expansion of the recycling infrastructure, supply and demand for recycled-content products, etc., and yet, the most fundamental indicator will be the statewide recycling rate itself. Therefore, tracking statewide progress will depend upon collection and analysis of performance data across the whole system.