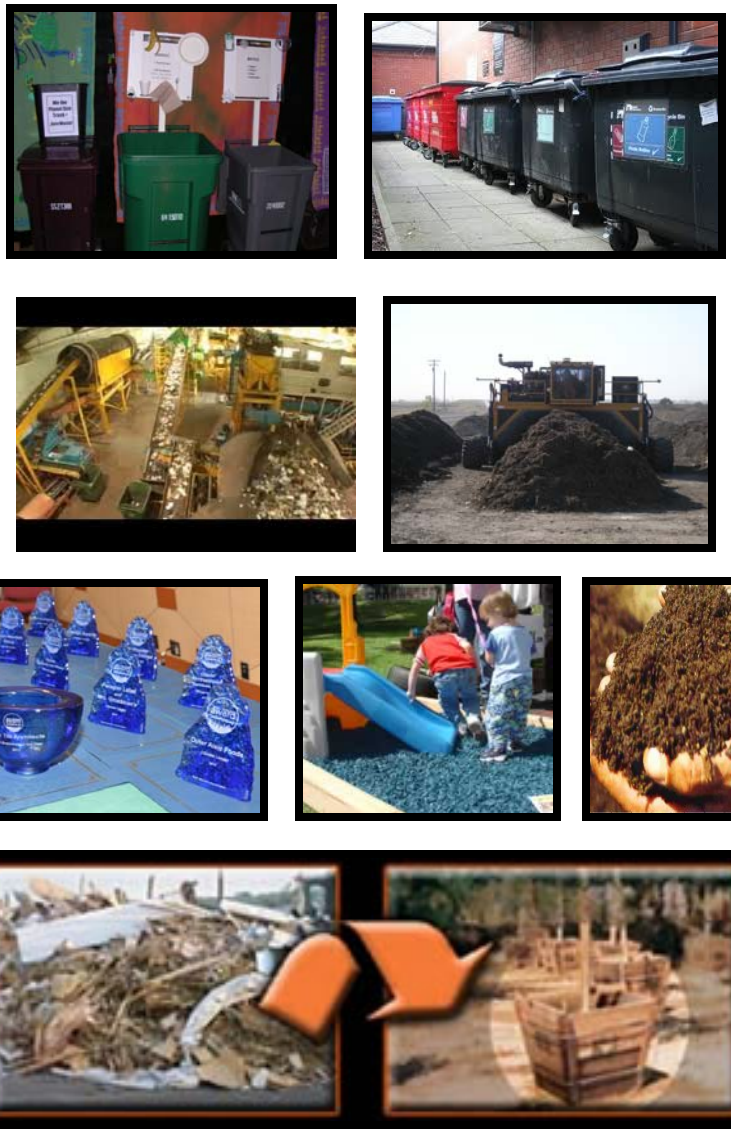
STAFF REPORT: INITIAL STATEMENT OF REASONS FOR THE PROPOSED RULEMAKING



TO REDUCE GREENHOUSE GAS EMISSIONS BY REQUIRING COMMERCIAL BUSINESSES TO RECYCLE

State of California
DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY
AIR RESOURCES BOARD

Release Date: August 31, 2011

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STAFF REPORT

PROPOSED REGULATION TO REDUCE GREENHOUSE GAS EMISSIONS BY REQUIRING COMMERCIAL BUSINESSES TO RECYCLE

To be considered by the Air Resources Board on October 20-21, 2011 at:

California Environmental Protection Agency
Byron Sher Auditorium
1001 I Street
Sacramento, California

California Department of Resources Recycling and Recovery
P.O. Box 4025
Sacramento, California 95812

Air Resources Board
P.O. Box 2815
Sacramento, California 95812

State of California
DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY
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PROPOSED REGULATION TO REDUCE GREENHOUSE GAS EMISSIONS BY REQUIRING COMMERCIAL BUSINESSES TO RECYCLE

Staff Report

Prepared by:

Materials Management and Local Assistance Program
Statewide Technical and Analytical Resources Division
California Department of Resources Recycling and Recovery (CalRecycle)

Stationary Source Division
California Air Resources Board (ARB)

Lead Authors

Tracey M. Harper, CalRecycle
Teri Wion, CalRecycle
Marshalle Graham, CalRecycle
Brian Larimore, CalRecycle
Janelle Auyeung, CalRecycle
Frank Limacher, CalRecycle

Contributing Authors

David Edwards, ARB
Mei Fong, ARB

Legal Counsel

Tamar Dyson, Staff Counsel, CalRecycle Legal Affairs Office
Aron Livingston, Counsel, ARB Office of Legal Affairs

Reviewed by:

Howard Levenson, Director, Materials Management and Local Assistance Program
Brenda Smyth, Chief, Statewide Technical and Analytical Resources Division
Cara Morgan, Chief, Local Assistance and Market Development Division
Clark Williams, Supervisor, Climate Change and Technology Section
CalRecycle

Richard Corey, Chief, Stationary Source Division
Daniel E. Donohoue, Chief, Emissions Assessment Branch
Robert Krieger, Manager, Emissions Evaluation Section
Research Division
Air Resources Board

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Proposed Regulation to Reduce Greenhouse Gas Emissions by Requiring Commercial Businesses to Recycle

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ACRONYMS

AB	Assembly Bill
AB 32	Assembly Bill 32, California Global Warming Solutions Act of 2006
ARB/Board	Air Resources Board
Btu	British Thermal Units
Btu/ft3	British Thermal Units per Standard Cubic Foot
Btu/hr	British Thermal Units per Hour
CCA	California Clean Air Act
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CalRecycle	California Department of Resources Recycling and Recovery
CO	Carbon Monoxide
CO2	Carbon Dioxide
CO2E	Carbon Dioxide Equivalent
CFR	Code of Federal Regulations
CNG	Compressed Natural Gas
DTSC	Department of Toxic Substances Control
EG	Emission Guidelines
EO	Executive Order
FOD	First-Order Decay
GHG	Greenhouse Gas
GWP	Global Warming Potential
H&S	Health and Safety Code
ICLEI	International Council for Local Environmental Initiatives
LEA	Local Enforcement Agencies
LFG	Landfill Gas
LFGTE	Landfill Gas to Energy
LNG	Liquid Natural Gas
MMTCO2E	Million Metric Tons of Carbon Dioxide Equivalents
MSW	Municipal Solid Waste
N2O	Nitrous Oxide
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

INITIAL STATEMENT OF REASONS
MANDATORY COMMERCIAL SOLID WASTE RECYCLING REGULATION

Executive Summary

INTRODUCTION

This summary presents an overview of the proposed Mandatory Commercial Solid Waste Recycling Regulation (Commercial Recycling Regulation or regulation). The overview was prepared jointly by the staffs of the Department of Resource Recovery and Recycling (CalRecycle), formerly known as the California Integrated Waste Management Board, and the Air Resources Board (ARB or Board). For simplicity, the summary is presented in question and answer format.

The proposed Mandatory Commercial Recycling regulation institutes mandatory commercial solid waste recycling programs that would apply to businesses, multifamily residences with 5 or more units, and public entities, that generate 4 cubic yards or more of commercial solid waste per week. The proposed regulation requires local jurisdictions to implement a commercial recycling program. The program must consist of providing education and outreach to affected businesses to inform them of the requirement to recycle and how to recycle in the jurisdiction, and monitoring the businesses' compliance with the proposed regulation.

1. What is the purpose of the proposed Commercial Recycling Regulation?

The purpose of the proposed Commercial Recycling Regulation is to reduce greenhouse gas emissions by diverting commercial solid waste to recycling efforts and to expand the opportunity for additional recycling services and recycling manufacturing facilities in California. The increase in recyclable materials will provide increased feedstock for recycled-content product manufacturers. Many of these manufacturers are located outside of California. New and expanded recycling manufacturing and associated creation of jobs in California could be stimulated by new economic incentives, which are outside the scope of and are not assumed to occur with this regulation. The increased diversion through recycling of 1.7 million tons of commercial solid waste will reduce greenhouse gas (GHG) emissions by 5 million metric tons of carbon dioxide (CO_2) equivalents ($MMTCO_2e$) per year by 2020. GHG reductions would begin in 2012 and are expected to increase by about 0.5 $MMTCO_2e$ per year until reaching the full implementation goal of 5 $MMTCO_2e$ per year in 2020. While most of these emission reductions will occur at locations outside of California due to the reduced raw material usage in the production process from facilities outside of California, Californians will still benefit due to the primarily global nature of GHG emissions and their effect on climate change.

2. Why was the proposed regulation developed jointly by the ARB and Cal/Recycle?

Assembly Bill (AB) 32, The California Global Warming Solutions Act of 2006 (Chapter 488, Statutes of 2006) directs the ARB to work with all agencies to reduce statewide GHG emissions to 1990 levels by the year 2020. ARB has identified several sectors where these reductions could occur (e.g., transportation, commercial and residential, electricity, industrial, waste management/recycling, high-global warming potential substances, and agriculture). For the recycling and waste sector, potential strategies to achieve GHG emission reductions include mandatory commercial solid waste recycling, landfill methane capture, organic waste diversion alternatives, and product stewardship.

CalRecycle is the appropriate State agency to lead the development and implementation of the Commercial Recycling measure given its historical authority and expertise in solid waste management and recycling activities. Chief among these authorities is the California Integrated Waste Management Act of 1989 (AB 939) which establishes a 50 percent waste diversion mandate for local jurisdictions and state agencies, and requires CalRecycle to periodically (every 2 or 4 years) evaluate jurisdictions' implementation of diversion programs.

However, the authority to adopt this GHG reduction measure lies with the ARB. Therefore, because of these joint responsibilities, CalRecycle developed the proposed regulation in concert with ARB staff. CalRecycle will implement and enforce the regulation in a manner similar to its current role as outlined in AB 939. ARB staff will maintain an oversight role and assist CalRecycle in the enforcement of the regulation if deemed necessary.

To clarify the tasks for implementing this measure, CalRecycle and ARB have entered into a Memorandum of Understanding (MOU) which outlines the roles of the two agencies (Appendix K). This MOU embodies the arrangement regarding CalRecycle's ability to implement and enforce the regulation and ARB's authority to monitor compliance with and enforce the regulation.

3. What is commercial solid waste?

Commercial solid waste is material generated by public entities and private businesses that is generally disposed of by landfilling. About 75 percent, or 28 million tons, of the 36 million tons of solid waste deposited in California's landfills each year is from the commercial sector. The exact amount of total solid waste disposed and the proportion and amount from the commercial sector varies from year to year, especially due to changes in the overall economy. The commercial sector includes businesses; multifamily residential complexes; and local, state, and federal governmental entities. Collection, transportation, and landfill management of 28 million tons of commercial solid waste is estimated to cost about $2.66 billion annually. The composition of commercial solid waste is summarized in Table ES-1 below.

Table ES-1. Composition of Currently Landfilled Commercial Solid Waste[1]

Material	Tons	Percentage of Commercial Solid Waste
Plastics	1,704,675	6.2%
Paper	3,876,128	14.1%
Metal	926,482	3.4%
Glass	240,306	0.9%
Construction & Demolition (C&D)	2,210,302	8.0%
Organics	4,739,861	17.2%
Carpet	661,671	2.4%
Tires	35,944	0.1%
All Other Materials[2]	13,187,222	47.8%
Total	27,582,590	100.0%

1 Source: HF&H (2011)

2 All Other Materials include types of paper, glass, plastic, and metal not targeted for recycling, as well as household hazardous waste, electronic waste, some construction and demolition waste, bulky items, and other waste.

4. To whom does the proposed regulation apply?

The proposed regulation applies to all businesses, multifamily residences with 5 or more dwelling units, and public entities that generate 4 cubic yards or more of commercial solid waste per week. The proposed regulation also applies to local jurisdictions that are responsible for solid waste disposal activities within their city, county, or region. The regulation does not apply to single family dwellings, multiple family dwellings of 4 or fewer units, or those that generate less than 4 cubic yards of commercial solid waste per week. Local jurisdictions, in consultation with CalRecycle, can establish other differing program requirements.

5. Why was 4 cubic yards of solid waste per week selected as the threshold for requiring commercial recycling?

The 4 cubic yard threshold was selected for several reasons. First, it is the size of the typically used waste bin for commercial operations. Second, many existing ordinances use a 4 cubic yard threshold for commercial solid waste. Third, the 4 cubic yard threshold captures about 75 percent of solid waste generated by commercial businesses. Fourth, it focuses implementation efforts on a manageable number of commercial businesses, about 320,000. Without the 4 cubic yard threshold and multifamily unit threshold, the universe of affected commercial businesses and multifamily complexes would be about 1,500,000.

6. How many businesses in California would be impacted by the proposed regulation?

Staff estimates that about 320,000 businesses and multifamily residences will have to take specific actions to comply with the proposed regulations. Of this total, about

250,000 are businesses and the remaining 70,000 are multifamily residence complexes. The affected businesses represent approximately 20 percent of California's 1.5 million businesses and are responsible for about 75 percent of the commercial solid waste generated in California. Using the California Department of Finance Department of General Services criteria for a small business (less than 100 employees), about 93 percent of these businesses and multifamily residences would be considered "small" businesses. The regulated multifamily residences represent about 60 percent of the solid waste generated by all multifamily residences. The regulation does not apply to single family dwellings, multiple family dwellings of 4 or fewer units, or those that generate less than 4 cubic yards of commercial solid waste per week.

7. What are the requirements for businesses affected by the proposed regulation?

The proposed regulation will require all businesses, multifamily dwellings of 5 or more units, and public entities, which generate 4 cubic yards or more of commercial solid waste per week to take the following actions beginning July 1, 2012:

(1) Separate recyclable materials from their solid waste stream and either self-haul, subscribe to a hauler, and/or otherwise arrange for the pickup of recyclables, so that the separated material is diverted from disposal to recycling, reuse, or composting activities; or

(2) Subscribe to a recycling service that includes mixed waste processing alone or in combination with other programs, activities or processes that diverts recyclable materials from disposal, yielding diversion results comparable to source separation.

The proposed regulation does not specify how much or what type of materials must be recycled, nor does it limit the types of materials that could be included in a recycling program. By not specifying which materials must be recycled, jurisdictions, businesses, and service providers have greater flexibility in determining the most cost-effective approach(s) to commercial recycling. While the proposed regulation does not specify which materials must be diverted, most businesses will likely select metals, paper, glass, plastics, and in some cases, lumber, green waste and food waste for recycling and/or composting. The cumulative effect of commercial recycling programs will be to cost-effectively achieve the GHG emissions reduction goal of 5 $MMTCO_2e$ from commercial solid waste by 2020 and beyond.

8. What are the requirements for local jurisdictions affected by the proposed regulation?

Each local jurisdiction is required to implement a commercial recycling program by July 1, 2012, that consists of providing education and outreach to affected businesses to inform them of the requirement to recycle and how to recycle in the jurisdiction, and monitoring the businesses' compliance with the proposed regulation. If a jurisdiction

already has a commercial recycling program that targets affected businesses and addresses the outreach, education, and monitoring components of the regulation, the jurisdiction would not be required to implement a new or expanded program.

A jurisdiction's commercial recycling program could also include, but is not limited to, implementing a mandatory commercial recycling policy or ordinance, requiring mandatory commercial recycling through the franchise contract or agreement, and/or requiring that all commercial recycling materials go through a mixed waste processing system that, as part of a system in combination with other programs, activities, and processes, diverts material at a level comparable to source separation. Jurisdictions are allowed flexibility to design and implement a commercial recycling program that meets their needs, meets the needs of the businesses that are required to recycle, and works within their existing infrastructure. Jurisdictions may, but are not required to, implement an enforcement component to address non-complying businesses.

There are currently about 540 local jurisdictions in California responsible for solid waste management. Of these, 46 jurisdictions already have commercial recycling programs in place. CalRecycle staff will determine the jurisdictions that meet the requirements of the regulation.

9. How will the proposed regulation reduce GHGs?

Increasing the amount of commercial solid waste that is recycled, reused, or composted will reduce GHG emissions primarily by: 1) reducing the energy requirements associated with the extraction, harvest, and processing of raw materials; and 2) using recyclable materials that require less energy than raw materials to manufacture finished products. Although not explicitly included in the estimated GHG reduction scenarios, the increased diversion of organic materials (green and food waste) will also reduce GHG emissions by redirecting this material to processes that use the solid waste material to produce vehicle fuels, heat, electricity, or compost.

10. How were GHG emission reductions from the proposed regulation estimated?

To estimate the GHG emission reductions from the proposed regulation, emission reduction factors were developed for traditional recyclables (i.e., metals, glass, plastics, paper products, and lumber). The factors were based upon a life-cycle methodology that incorporates the avoided emissions from using raw materials in the manufacturing process, forest carbon sequestration, and transportation. Based on staff's estimate, diversion of 1.7 million tons of recyclable commercial solid waste – the amount dependent on which materials are diverted and their corresponding GHG emission reduction factors, which vary among material types – would reduce GHG emissions by about 5 $MMTCO_2e$.

11. What are the estimated costs of the proposed regulation to affected businesses?

In developing this regulatory proposal, staff evaluated the potential economic impacts on representative private persons or businesses. The cost estimates use California specific data to account for all costs incurred in collecting, transporting, and processing a sufficient amount of commercial solid waste to meet a goal of reducing GHG emissions by 5 MMTCO2e. Staff considered cost impacts to businesses at full implementation in 2020 and over the time it will take to implement the regulation from 2012 to 2020.

Implementation of the proposed regulation will be gradual, beginning in July of 2012 with full implementation in 2020. Systemwide costs in the beginning years of the program will result in a cost savings for the first seven to eight years; costs will gradually increase over time until full implementation in 2020. The net cost savings that result in the early years are due primarily to using existing collection system capacity. The costs are offset by the value of the recycled materials sold as commodities and reduced landfill disposal costs. As collection tonnages increase beyond a certain level, costs of collection would increase. Over the 2012 through 2020 time period, the average annual savings to a typical business would be between $119 and $180 per year, and for an average household living in a multifamily complex a savings of between $5 and $7 per year. The average annual savings includes the cost savings from businesses and the costs to the local jurisdictions. We assume that the jurisdictions will pass their costs on to affected businesses. During this period, we estimate that the proposed regulation will result in a systemwide savings of between $343 million to $519 million (NPV: $320 to $458 million, using a discount rate of 5%).

As discussed above, the cost of the regulation will increase as collection tonnages increase beyond a certain level. By 2017 or 2018, there will be a cost associated with this regulation. This increase in cost is due primarily to the increase in the collection and processing of recyclable materials beyond the current system capacity and therefore the need to purchase additional recycling trucks, processing equipment, and hire personnel. At full implementation in 2020 the estimated costs for an average business would increase by between $8 to $14 per month, for an average household living in a multifamily complex covered by the rule costs would increase by between $0.3 and $0.6 per month.

The cost estimates are based on reasonable expectations of how businesses will comply with the proposed regulation. Several additional factors may contribute to lower costs including: waste reduction through increased business efficiencies, greater reuse of materials, less waste through more efficient packaging, and lower dollar per ton recycling costs through economies of scale.

12. What are the estimated costs to local jurisdictions, schools, and state and federal entities?

Local jurisdictions, school districts, community colleges, universities, and state and federal entities are considered "businesses" for the purpose of the proposed regulation. As a result, they would be required to have a recycling program if they generate 4 cubic yards or more of solid waste per week. Most local jurisdictions are already implementing recycling programs at their offices/facilities as part of the AB 939 diversion program or due to voluntary actions. As a result, staff does not anticipate additional costs for local jurisdictions to comply with the recycling element of the proposed regulation. We do not anticipate costs to schools or state and federal entities since required or voluntary actions have resulted in recycling programs that will comply with the proposed regulation.

However, local jurisdictions, CalRecycle, and ARB may experience costs implementing and enforcing the requirements of the proposed regulation. Local jurisdictions are required to provide education, outreach, and monitoring. To implement these requirements, staff estimates that local jurisdictions will experience increased annual costs of approximately $12,000 for small jurisdictions to $110,000 for large jurisdictions at full implementation of the regulation in 2020 (i.e., about ¼ to 1 person year depending on the size of the jurisdiction). The total annual statewide cost for local jurisdictions to implement the proposed regulation is estimated to be about $12 million per year when the regulation is fully implemented in 2020. These costs are relatively low because most jurisdictions already have recycling programs that focus on education and outreach to the commercial sector, as well as some monitoring efforts. This is a direct result of the passage of AB 939. These programs can be expanded at a relatively low cost to include the requirements for commercial solid waste recycling.

Staff estimates that costs to CalRecycle will be approximately $500,000 per fiscal year (5PYs) for monitoring, oversight, and enforcement. These costs can be met within the existing budget. Additionally, CalRecycle anticipates contract costs of about $1 million in 2014 and 2019 for waste characterization studies needed to determine the program's effectiveness and approximately $90,000 (0.5PY) for contract development and management; these costs cannot be met within the existing budget. ARB costs are estimated to be about $200,000 per fiscal year through 2020. This cost can be met within the existing budget. The costs after 2020 will depend on how many enforcement cases need to be handled by ARB staff.

13. What is the cost-effectiveness of the proposed regulation?

The average cost-effectiveness of the proposed regulation in 2020 is anticipated to be $6 to $11 per metric ton of CO_2e reduced. However, due to cost savings in the early years of the program the average cost-effectiveness over the 2012 through 2020 time period is a savings of $14 to $21 per metric ton of CO_2e.

14. What economic benefits to California are anticipated due to the proposed regulation?

Implementation of the proposed regulation is estimated to result in overall cost savings to California businesses over the 2012 through 2020 time frame. Previous studies on the economic impact of recycling versus disposal have found significant positive effects in California. The additional benefits from recycling will not only generate additional jobs but would also result in additional goods and services.

15. What other benefits are anticipated?

In addition to significant greenhouse gas reductions, this regulation will result in numerous other benefits described in Chapter IV and V of this report. These include overall cost savings to California businesses over the 2012 through 2020 time frame; a net creation of jobs, goods, and services; reduced emissions of methane, air toxics, and criteria pollutants from landfills; reduced greenhouse gas, criteria, and toxic air pollutant emissions associated with extraction, processing, and transportation of virgin materials to manufacturing facilities; and, when organic materials are used as compost, positive impacts on soil and water quality. Individual businesses will realize cost savings by recycling and reducing their trash service costs. The regulation also will help jurisdictions to develop or enhance commercial recycling programs, help the state to further reduce disposal at landfills and continue meeting AB 939 diversion goals, and continue moving us towards a zero waste society.

These benefits are significant, but they only reflect the direct, short-term benefits of this regulation. This regulation is the first step in setting the commercial recycling stage for even more significant long-term greenhouse gas emission reductions and helping to stimulate California's green economy and create jobs.

Today, while some of the recyclable materials collected in California remain in the state for remanufacturing, the vast majority are shipped to other parts of the United States or to global markets. Keeping these materials in California would result in increased feedstock for expanding or new California recycling manufacturers, thus creating “green” jobs and stimulating California’s economy. This potential expansion of recycling manufacturing in the State will require new policies and incentives beyond the scope of this regulation, but the regulation is critical in setting the stage for these efforts. The long-term results will be positive for everyone -- businesses grow, tax revenue is generated, California jobs are created, California dependence on volatile foreign recycling markets is reduced, the amount of waste sent to landfills is reduced, resources are conserved and new sources of biofuels and energy are created, and greenhouse gas emissions are significantly reduced.

16. How will implementation of the proposed regulation be monitored and enforced?

Again, CalRecycle will integrate implementation of the proposed regulation into its existing AB 939 jurisdiction review process. Recently enacted legislation (Senate Bill 1016, Wiggins, Chapter 343, Statutes of 2008) builds on AB 939 compliance requirements by establishing streamlined reporting, simplifying measurement, and codifying program implementation. The proposed mandatory commercial recycling regulation is consistent with the current jurisdiction reporting and review process for determining jurisdiction compliance with the existing, well-established AB 939 diversion mandates.

Jurisdictions currently report annually on the status of their AB 939 diversion program implementation using the existing CalRecycle Electronic Annual Report. Under the proposed regulation, jurisdictions will be required to report on commercial recycling program implementation beginning with the 2012 Electronic Annual Report. CalRecycle staff would then evaluate program implementation efforts as part of each jurisdiction's overall AB 939 program evaluation. For those jurisdictions on a two-year review cycle, this evaluation would begin in 2014 and continue thereafter every two years, and for jurisdictions on a four-year review cycle, the evaluation would begin in the year 2016 and continue thereafter every four years. CalRecycle may also choose to conduct a compliance review anytime outside of the two and four-year review cycles if it determines that a jurisdiction is not implementing a program in compliance with the regulation.

If, during this review, CalRecycle finds that a jurisdiction has failed to make a good faith effort to implement a commercial recycling program that consists of education, outreach, and monitoring of the businesses as defined, CalRecycle would issue a compliance order with a specific schedule for correcting any deficiencies. CalRecycle would also subsequently determine whether the jurisdiction has complied with the terms of the compliance order. If a jurisdiction fails to comply with the terms of the compliance order, CalRecycle would take further enforcement action, including potential imposition of penalties under CalRecycle's established AB 939 procedures contained in section 41850 of the Public Resources Code. Within 60 days, CalRecycle would document its determination that the jurisdiction was found to be out of compliance and was penalized, and would forward that documentation to the ARB.

CalRecycle will also provide technical assistance to local jurisdictions in the form of training, model ordinances and contracts, decision making tools, and other implementation support as requested by local jurisdictions.

17. What alternatives to the proposed regulation were considered?

California Government Code §11346.2 requires ARB to consider and evaluate reasonable alternatives to the proposed regulation. Staff evaluated four key alternatives to the proposed regulation: (1) no action; (2) implementing a voluntary measure; (3) extending the time for full implementation by 5 years; and (4) decreasing the time for

full implementation by 5 years. As discussed in the staff report, staff has determined that no alternative to the proposed regulation would be more effective and none would be as effective or less burdensome to affected stakeholders.

18. What are the emission impacts of the proposed regulation?

The proposed regulation will reduce GHG emissions by 5 $MMTCO_2e$ by 2020, as well as unquantified reductions in criteria and toxic emissions. These "upstream" emission reductions will occur at businesses that reduce raw materials usage by using recycled materials in the production process. A majority of these emission reductions would occur at locations outside California. Based on the type and amount of materials recycled under Scenarios 2.1 and 2.2, about 5% of these reductions would occur within California. Methane (a GHG) and toxic emissions from the decomposition of organic materials disposed of at landfills would be reduced to the extent that green and food wastes are diverted from the landfill waste stream. Almost all of the emission reductions associated with landfilling organics would occur in California. However, emission reductions at landfills due to actions to comply with the proposed regulation are not accounted for in this analysis. To avoid double counting, emission reductions due to decreases in solid waste sent to landfills are accounted for in the landfill category under separate ARB regulations. Further, the emission reductions at landfills are primarily methane and some volatile organic compounds (VOC) emissions that would not entirely offset the potential increase in diesel particulate matter (PM) and oxides of nitrogen (NO_x) due to increased vehicle miles traveled handling the recyclables diverted from landfills.

Some California locations will see a small increase or decrease in transportation related emissions, including diesel PM and NO_x, due to changes in traffic patterns associated with landfill and recycling activities. Diversion of 1.7 million tons of material from landfills will result in reduced traffic and corresponding reductions in vehicle emissions previously occurring due to transport of materials to landfills. Some increase in emissions may occur due to increased recycling activities at non-landfill locations. If there should be increases in traffic related emissions at non-landfill locations, staff anticipates the amount would be small and can be addressed. There may also be a small increase in VOC emissions near composting facilities due to an increase in VOC emissions from composting activities. However, the localized VOC increase can be effectively managed by work practice and existing emission control reviews and emissions control requirements.

19. What are the health impacts of the proposed regulation?

The proposed regulation focuses on recycling of materials that otherwise would be landfilled, where the organic fraction of the disposal stream decomposes and releases methane. Landfill gas contains toxic air contaminants, including vinyl chloride, benzene, ethylene dibromide, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene. To the extent that implementation of increased commercial recycling results in less organic material being landfilled, toxic air contaminants contained in the

landfill gas resulting from decomposition of solid waste in landfills will also be reduced, thereby reducing the public's potential exposure to these compounds. Changes in traffic patterns due to decreased traffic to landfills and increased traffic to recycling locations will have a corresponding decrease or increase in exposure to transportation related emissions. However, the overall change will be very small and will be mitigated by existing ARB mobile source emissions control regulations. Overall, the proposed regulation will not adversely affect public health and instead will provide real public health benefits in California.

20. What are the environmental impacts of the proposed regulation?

Staff finds that there will be no significant adverse environmental impacts due to implementation of the proposed regulation. Since the proposed regulation will not require any new facilities to be built or expanded, ARB staff finds that there will be no reasonably foreseeable environmental impacts on aesthetics, land-use/planning, population and housing, transportation, agricultural and forestry resources, cultural resources, mineral resources, public services, utility and service systems, geology and soils, hydrology and water quality, or recreation.

The staff analysis thoroughly examined possible impacts on air quality, transportation/traffic, noise and odors and also found no significant impact in these areas. For air quality, staff found a net reduction in GHG, criteria, and toxic air emissions is expected due to decreases in emissions from extraction, processing, and transportation by substituting recycled materials for raw materials. However, much of the criteria and toxics benefits will occur at the point of reprocessing the recycled material. Since most reprocessing of recycled material occurs outside California, most of the criteria and toxic benefits would also occur outside California.

There is uncertainty in predicting the change in waste collection vehicle miles travelled (VMT) associated with recycling activities because of the difficulty in predicting how the affected industry will respond. There could be an increase, decrease, or possibly no change in the VMT. An increase in VMTs has the potential to adversely impact traffic/transportation and air quality due to emissions from waste collection vehicles. However, staff's analysis determined that a variety of factors will cause there to either be no increase or even a decrease in VMT resulting from implementation of the proposed regulation. For example, because the enhanced education and outreach effort by the local jurisdictions due to the proposed regulation, it is possible that businesses will take additional actions outside the scope of this regulation such as decreasing packaging and increasing the reuse of products. Taking these types of actions could result in less waste generated and therefore fewer trips taken to landfills, which would result in an overall decrease in VMT required and lowered emissions estimates. A detailed discussion of these factors is found in Chapter VI of this report. Further, even if there were some increase in VMTs, overall emissions from waste collection vehicles used to collect and transport waste and recyclables will continue to decline in future years due to the implementation of ARB's diesel mobile source regulations. Thus, staff finds that there will be no significant adverse traffic or emissions

impacts due to implementation of the proposed regulation. However, staff will monitor VMT changes during implementation of the proposed regulation and take action to ensure that there is no net increase in emissions in California associated with the proposed regulation.

21. What opportunities were provided for stakeholders to participate in the development of the proposed regulation?

Staff has made extensive efforts to provide opportunities for participation in the rulemaking process. Staff's public outreach efforts included meetings with stakeholders through eight public workshops, speaking at a variety of conferences with stakeholders, speaking at various local government meetings, participating in informal meetings, teleconferences and phone calls with interested stakeholders, as well as creating and maintaining a website and an email address list to automatically update interested parties about rulemaking developments. The January 2011 workshop provided detailed information to the stakeholders on the potential emissions, economic, and environmental impact of the proposed rule; in addition, staff sought feedback on draft regulatory language. In July 2011, staff held a workshop to discuss additional economic analyses conducted in response to comments received at the January workshop, as well as solicit feedback again on the draft regulatory language.

Numerous notifications of workshops were sent via CalRecycle and ARB listservs to interested parties including: affected businesses and business associations, apartment and realtor associations, waste haulers and recyclers, landfill operators, environmental groups, local jurisdictions, school districts, community colleges and universities. Additionally, workshop information was posted on the CalRecycle website. Staff conducted target outreach to numerous groups and associations including: California Chamber of Commerce, California Grocers Association, California League of Food Processors, Building Owners and Managers Association International, International Council of Shopping Centers, Commercial Real Estate Development Association, California Retailers Association, California Business Properties Association, California Association of Realtors, California Apartment Association, California Manufacturers & Technology Association, League of California Cities, California State Association of Counties, Regional Council of Rural Counties, Solid Waste Association of North America, California Association of Realtors, California Apartment Association California, California Resources Recovery Association, Californians Against Waste, and the California Association of Recycling Market Development Zones.

22. What are the key concerns that stakeholders have raised with the proposed regulation?

The two issues that have generated the most attention during the rule development process are:

- The exemption for multifamily complexes which generate less than 4 cubic yard of solid waste pre week.

- The requirement for mixed waste processing facilities to achieve material separation rates comparable to source separation.

Exemption for businesses and multifamily complexes that generate less than 4 cubic yards of solid waste per week.

The proposed regulation requires businesses and multifamily complexes with 5 or more units that generate 4 cubic yards or more of solid waste per week to recycle. Some believe that the 4 cubic yard exemption threshold should be reduced or eliminated. Staff does not agree. Removal of this exemption would increase the estimated number of affected entities from 320,000 to more than 1.5 million. An increase in the number of affected entities of this magnitude would create significant implementation challenges, would likely require additional infrastructure development, and would significantly change the program costs both for businesses and jurisdictions. Staff believes that the most reasonable approach is to keep the 4 cubic yard threshold exemption for the initial years of the program and reevaluate the appropriateness of the exemption as the program matures.

Requirement that mixed waste processing achieve diversion rates similar to source-separated programs.

Some believe that the proposed requirement that mixed waste process achieve diversion (recycling) rates comparable to source-separated programs is not reasonable, achievable, or appropriate. Staff disagrees, and believes that the requirement is appropriate and necessary. However, we agree that a facility-by-facility comparison is not appropriate at this time. Instead, we believe that the determination of "comparable" needs to consider mixed waste processing as part of a system in combination with other programs, activities, and processes, i.e., the diversion/recycling program as a whole. Staff has provided additional guidance on this approach in Chapter 3, will be developing additional implementation guidance on this issue once the regulations are adopted, and, as part of its normal AB 939 assistance and review processes, will be working with local jurisdictions as needed on an individual basis to assess this issue.

23. Is the proposed regulation consistent with ARB's Environmental Justice policies?

The proposed regulation is consistent with ARB's environmental justice policy to reduce health risk in all communities, including those with low-income and ethnically diverse populations, regardless of location. Potential risks from global warming due to GHGs can affect both urban and rural communities. Therefore, reducing GHGs emissions from the extraction of resources, from the manufacturing processes using recycled content versus raw materials, and from landfills will provide benefits to both urban and rural communities in the State, including low-income and ethnically diverse communities.

On a statewide level, it is anticipated that direct and indirect benefits of the regulation would result in reductions of GHGs, criteria pollutants, and toxic air contaminants. Thus, staff finds that there will be no significant adverse traffic or emissions impacts due to implementation of the proposed regulation. However, staff will monitor VMT changes during implementation of the proposed regulation and take action to ensure that there is no net increase in emissions in California associated with the proposed regulation.

I. INTRODUCTION

In this Chapter, staff provides background information on the proposed regulation, discusses its purpose, provides a brief summary of the proposal, and discusses the authority to adopt the proposed regulation. The roles and responsibilities of the Department of Resources Recycling and Recovery (CalRecycle) and the Air Resources Board (ARB or Board) in implementing and enforcing the proposed regulation are also discussed.

A. Background

This Staff Report: Initial Statement of Reasons (Staff Report) provides the basis for the CalRecycle and ARB staff's proposed Mandatory Commercial Waste Recycling Regulation (Commercial Recycling Regulation or regulation)**.** Further, the California Secretary for Resources has determined that ARB meets the criteria for a Certified State Regulatory Program (title 14, California Code of Regulations (CCR), subsection 15251(d). Therefore, this document also serves as a California Environmental Quality Act (CEQA) functional equivalent document pursuant to Public Resources Code (PRC) section 21080.5.

Climate change poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. Climate change is projected to detrimentally effect some of California's largest industries (including agriculture and tourism), to increase the strain on electricity supplies, and to contribute to unhealthy air.

National and international actions are necessary to fully address the issue of climate change. Action taken by California to reduce emissions of greenhouse gases (GHG) will have important effects by encouraging other states, the federal government, and other countries to act. By exercising a leadership role, California is also positioning its economy, technology centers, academic and financial institutions, and businesses to benefit from national and international efforts to reduce emissions of GHGs.

In 2005, Executive Order S-03-05 was issued and set in place the Climate Action Team and established targets to reduce GHG emissions to 1990 levels. The Legislature subsequently passed Assembly Bill (AB) 32 - the California Global Warming Solutions Act of 2006 (Chapter 488, Statutes of 2006). AB 32 directs the ARB to work with all agencies to reduce statewide GHG emissions to 1990 levels by the year 2020. The solid waste sector has been identified as a significant source of GHG emissions. For the solid waste sector, potential strategies to achieve GHG emission reductions include landfill methane capture, mandatory commercial solid waste recycling, organic waste diversion alternatives, and product stewardship.

In June 2009, the Board approved the *Regulation to Reduce Methane Emissions from Municipal Solid Waste Landfills.* The regulation, which became effective June 17, 2010, requires owners and operators of certain uncontrolled municipal solid waste (MSW)

landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner.

This rulemaking focuses on the mandatory commercial recycling strategy for achieving GHG reductions from the commercial solid waste sector. CalRecycle is the appropriate State agency to lead the development and implementation of the Commercial Recycling measure given its historical authority and expertise in solid waste management and recycling activities. Chief among these authorities is the California Integrated Waste Management Act of 1989 (AB 939) which establishes a 50 percent waste diversion mandate for local jurisdictions and state agencies, and requires CalRecycle to periodically (every 2 or 4 years) evaluate jurisdictions' implementation of diversion programs.

However, the authority to adopt this GHG reduction measure lies with the ARB. Therefore, because of these joint responsibilities, CalRecycle developed the proposed regulation in concert with ARB staff. CalRecycle will implement and enforce the regulation in a manner similar to its current role as outlined in AB 939. ARB staff will maintain an oversight role and assist CalRecycle in the enforcement of the regulation if deemed necessary.

To clarify the tasks for implementing this measure, CalRecycle and ARB have entered into a Memorandum of Understanding (MOU) which outlines the roles of the two agencies (Appendix K). This MOU embodies the arrangement regarding CalRecycle's ability to implement and enforce the regulation and ARB's authority to monitor compliance with and enforce the regulation.

About 28 million tons of the solid waste disposed in landfills each year in California comes from the commercial sector. The commercial sector has not been specifically targeted by state diversion laws, yet this sector disposes over 75 percent of the materials in landfills, including significant quantities of clean and readily recyclable materials. Increasing the amount of commercial solid waste that is recycled/reused/composted will reduce GHG emissions primarily by reducing the energy requirements associated with the extraction, harvest, and processing of raw materials and providing intermediate material at the point of recycling manufacturing that requires less energy to produce finished products. The increased diversion of organic materials (green and food waste) will reduce GHG emissions by redirecting this material to processes that use the solid waste material to produce vehicle fuels, heat, electricity, or compost material. Compost reduces GHG emissions by reducing the energy needed for irrigation and erosion control, and by reducing the need to use fossil fuel-derived fertilizers and pesticides. Diversion of organic waste from landfills will also reduce methane emissions from landfills.

B. Purpose

The purpose of the proposed Commercial Recycling Regulation is to increase the amount of commercial solid waste recycled in California by requiring businesses,

multifamily complexes with 5 or more dwelling units, and public entities, that generate 4 cubic yards or more of commercial solid waste per week to recycle. The increased diversion (through recycling) of 1.7 million tons of commercial solid waste would reduce GHG emissions by 5 million metric tons of carbon dioxide (CO_2) equivalents ($MMTCO_2e$) per year beginning in 2020. GHG reductions would begin in 2012 and are expected to increase by about 0.5 $MMTCO_2e$ per year until reaching the full implementation goal of 5 $MMTCO_2e$ per year in 2020. Further, by providing a dedicated stream of recyclable material, the proposed regulation will help expand the opportunity for additional recycling services and recycling manufacturing facilities in California. This increase in the availability of recyclable materials could provide increased feedstock for California recycled-content value added product manufacturers. Additionally, the proposed regulation can create an economic benefit to California with the creation of jobs through additional recycling services and recycling manufacturing in California.

Since about 28 million tons of the solid waste disposed in landfills each year comes from the commercial sector, increasing recycling by 1.7 million tons per year by 2020 should be a readily achievable goal. In addition, with continued expansion of the collection infrastructure and processing capacity to divert materials from the commercial sector, the potential exists to achieve even greater diversion and recycling manufacturing in California and subsequent GHG emission reductions in this sector.

C. Summary of the Proposed Regulation

The proposed regulation will require businesses, multifamily dwellings of 5 or more units, and public entities, that generate 4 cubic yards or more of commercial solid waste per week to take the following actions beginning July 1, 2012:

(1) Separate recyclable materials from their solid waste stream and either self-haul, subscribe to a hauler, or otherwise arrange for the pick-up of recyclables so that the separated material is diverted from disposal to recycling, reuse, or composting activities; or

(2) Subscribe to a recycling service that includes mixed waste processing alone or in combination with other programs, activities or processes that diverts recyclable materials from disposal and yielding diversion results comparable to source separation.

The proposed regulation also requires local jurisdictions to implement a commercial recycling program by July 1, 2012, that consists of providing education and outreach to affected businesses and monitoring compliance with the proposed regulation. If a jurisdiction already has a commercial recycling program that targets affected businesses and addresses the outreach, education, and monitoring components of the regulation, the jurisdiction would not be required to implement a new or expanded program. An explanation of the requirements for education, outreach and monitoring are in Chapter III.

The proposed regulation requires CalRecycle to evaluate each jurisdiction's performance in implementing its commercial recycling program, using the existing AB 939 review and compliance process, as well as evaluating statewide GHG emission reductions to ensure that the GHG goal is met.

The proposed regulation allows CalRecycle to take further enforcement action, including potential imposition of penalties under CalRecycle's established AB 939 procedures contained in section 41850 of the Public Resources Code. Although CalRecycle will implement the regulations and investigate potential violations, they may also refer cases of non-compliance to the Board for additional enforcement action. Further, ARB retains the oversight authority (section 95625) to enforce and subject violators to penalties for non-compliance as stated in HSC section 38580.

D. Regulatory Authority

AB 32 contains provisions in the Health & Safety Code (HSC) sections 38510 and 38530 that designate ARB as the state agency to monitor and regulate GHG emissions. In addition, longstanding authority pre-dating AB 32 provides ARB with comprehensive authority to develop rules and regulations related to air emissions. (HSC sections 39600, 39601, and 41511)

AB 32 also contains provisions in HSC section 38562 that apply to regulations adopted under the AB 32 authority. Those criteria are summarized below in italics along with staff's assessment as to why the proposed regulatory action complies with the specific criteria or does not apply to this rulemaking.

The State Board shall adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reduction from sources or categories of sources.

Staff has made extensive efforts to provide opportunities for participation in the rulemaking process. Staff's public outreach efforts included meetings with stakeholders through eight public workshops, speaking at a variety of conferences with stakeholders, speaking at various local government meetings, participating in informal meetings, teleconferences and phone calls with interested stakeholders, as well as creating and maintaining a website and an email address list to automatically update interested parties about rulemaking developments. The January 2011 workshop provided detailed information to the stakeholders of the potential emissions, economics, and environmental impacts of the proposed rule, as well as a draft regulation and a summary of the draft regulation. In July 2011, staff held a workshop to discuss additional economic analyses conducted in response to comments received at the January workshop, as well as to share changes made to the draft regulation and summary of the regulation since the January 2011 workshop.

Numerous notifications of workshops were sent to interested parties via CalRecycle and ARB listservs which included: affected businesses and business associations,

apartment and realtor associations, waste haulers and recyclers, landfill operators, environmental groups, local jurisdictions, school districts, and colleges and universities. Additionally, workshop information was posted on the CalRecycle website. Staff conducted targeted outreach to numerous groups and associations including: California Chamber of Commerce, League of California Cities, California State Association of Counties, Regional Council of Rural Counties, Solid Waste Association of North America, California Association of Realtors, California Apartment Association, California Resource Recovery Association, Californians Against Waste, California Manufacturers and Technology Association, Los Angeles County Solid Waste Management Committee/Integrated Waste Management Task Force, Orange County Local Task Force, Northern California Recycling Association, and the California Association of Recycling Market Development Zones.

Design the regulations, including distribution of emissions allowance where appropriate, in a manner that is equitable, seeks to minimize costs and maximize the total benefits to California, and encourages early action to reduce greenhouse gas emissions.

The proposed regulation applies equally to all businesses, multifamily residences with 5 or more units, and public entities, that generate 4 cubic yards or more of solid waste per week. The proposed regulation does not specify how much or what type of materials must be recycled, nor does it limit the types of materials that could be included in a recycling program. Jurisdictions retain their flexibility to design and implement a commercial recycling program that meets their needs, meets the needs of the businesses that are required to recycle, and works within their existing infrastructure. By not specifying which materials must be recycled and by providing flexibility in program design, jurisdictions, businesses, and service providers have greater flexibility in determining the most cost-effective approach(s) to commercial recycling. Program flexibility also allows local jurisdictions to move more quickly in implementing recycling programs if they wish.

Ensure that activities undertaken to comply with the regulations do not disproportionately impact low-income communities.

The proposed regulation applies to all businesses, all multifamily residences with 5 or more units, and public entities, that generate 4 cubic yards or more of solid waste per week. No disproportionate impact is expected for low-income communities.

Ensure that entities that have voluntarily reduced their greenhouse gas emissions prior to the implementation of this section receive appropriate credit for early voluntary reductions.

Entities that have voluntarily implemented a recycling program that reduces the amount of commercial solid waste generated would more than likely meet the requirements of the regulation and therefore would not be impacted. Therefore, in these cases, early action would exempt a business, multifamily complex, or public entity from further action under the proposed regulation.

Ensure that activities undertaken pursuant to the regulations complement and do not interfere with, efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions.

The proposed regulation will not interfere with efforts to reduce criteria pollutants and toxic air contaminants (TACs). In fact, implementation of the proposed regulation is expected to result in net reductions in GHGs, criteria, and TAC emissions due to decreases from extraction, processing, and transportation by substituting recycled materials for raw materials in recycling manufacturing processes. Diversion of organic waste from landfills will also reduce methane emissions from landfills. A small increase in air emissions is expected primarily due to increased vehicular activity to support recycling activities. However, the increase is very small and existing regulations for diesel equipment will minimize emissions increases and further reduce them as more stringent future requirements become effective.

Consider cost-effectiveness of these regulations.

On a statewide basis, the cost-effectiveness of GHG reductions at full implementation is estimated to be $6 to $11 per metric ton of CO_2e ($MTCO_2e$) reduced. However, due to cost savings in the early years of the program, the equivalent cost-effectiveness over the 2012 through 2020 time period is a net present value (NPV) savings of $13 to $18 per metric ton of CO_2e. Based on our analysis, which is provided in Chapter V of this report, we do not expect any adverse economic impact on affected businesses.

Consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health.

Increasing the amount of commercial solid waste that is recycled, reused, or composted will reduce GHG emissions primarily by reducing the energy requirements associated with the extraction, harvest, and processing of raw materials and will provide intermediate materials at the point of recycling manufacturing that require less energy to turn into finished products. The increased diversion of organic materials (green and food waste) will reduce GHG emissions by redirecting this material to processes that use these solid waste materials to produce vehicle fuels, heat, electricity, or compost. Compost further reduces GHG emissions by reducing the energy needed for irrigation and erosion control, and by reducing the need to use fossil fuel-derived fertilizers and pesticides. Diversion of organic waste from landfills will also reduce methane emissions from landfills. The cumulative effect of commercial recycling programs will be cost-effectively achieving the GHG emissions reduction goal of 5 $MMTCO_2e$ from commercial solid waste by 2020.

In addition to GHG benefits, increased recycling reduces amount of material that needs to be landfilled and incorporates sustainability into CA businesses practices which would benefit the environment.

Minimize the administrative burden of implementing and complying with these regulations.

CalRecycle will integrate implementation of the proposed regulation into its existing AB 939 jurisdiction review process. Recently enacted legislation (Senate Bill (SB) 1016, Wiggins, Chapter 343, Statutes of 2008) builds on AB 939 compliance requirements by establishing streamlined reporting, simplifying measurement, and codifying program implementation. The proposed Commercial Recycling Regulation is consistent with the current jurisdiction reporting and review process for determining jurisdiction compliance with the existing, well-established AB 939 diversion mandates.

Minimize leakage.

Since commercial solid waste would not be transported outside of California, this requirement is not applicable to this proposed rulemaking.

Consider the significance of the contribution of each source or category of sources to statewide emissions of greenhouse gases.

The purpose of the proposed regulation is to increase the amount of commercial solid waste recycled in California by requiring businesses, multifamily residences with 5 or more units, and public entities, which generate 4 cubic yards or more of commercial solid waste per week to recycle. In 2008, the commercial sector accounted for 28 million tons of the 36 million tons of solid waste generated in California. The increased diversion (through recycling) of 1.7 million tons of commercial solid waste would reduce GHG emissions by 5 $MMTCO_2e$ per year by 2020. GHG reduction would begin in 2012 and are expected to increase by about 0.5 $MMTCO_2e$ per year until reaching the full implementation goal of 5 $MMTCO_2e$ per year in 2020. Given that ARB is adopting measures achieving GHG reductions of as low as 1 MMTCO2e per year, the GHG reductions estimated from this measure are significant.

The greenhouse gas emission reductions achieved are real, permanent, quantifiable, verifiable, and enforceable by the State board.

Jurisdictions currently report annually on the implementation status of their AB 939 diversion program implementation using the CalRecycle Electronic Annual Report. Under the proposed regulation, jurisdictions will be required to report on commercial recycling program implementation beginning with the 2012 Electronic Annual Report. CalRecycle staff would then evaluate program implementation efforts as part of each jurisdiction's overall AB 939 program evaluation. For those jurisdictions on a two-year review cycle, this evaluation would begin in 2014 and continue every two years, and for jurisdictions on a four-year review cycle, the evaluation would begin in the year 2016 and continue every four years thereafter. CalRecycle may also choose to conduct a compliance review anytime outside of the two and four-year review cycles if it

has cause to believe that a jurisdiction is not implementing a program in compliance with the regulation.

If during this review, CalRecycle finds that a jurisdiction has failed to make a good faith effort to implement its commercial recycling program that consists of education, outreach, and monitoring of the businesses as defined, CalRecycle would issue a compliance order with a specific schedule for correcting any deficiencies. CalRecycle would also subsequently determine whether the jurisdiction has complied with the terms of the compliance order. If a jurisdiction fails to comply with the terms of the compliance order, CalRecycle would take further enforcement action, including potential imposition of penalties under CalRecycle's established AB 939 procedures contained in section 41850 of the Public Resources Code. Although CalRecycle will implement the regulations and investigate potential violations, they may also refer cases of non-compliance to the Board for additional enforcement action. Further, ARB retains the oversight authority (section 95625) to enforce and subject violators to penalties for non-compliance as stated in HSC section 38580.

The reduction is in addition to any greenhouse gas emission reduction otherwise required by law or regulation, and any other greenhouse gas emission reduction that otherwise would occur.

The GHG emission reductions goal of 5 MMTCO2e from the commercial solid waste sector would be achieved without this regulation.

If applicable, the greenhouse gas emission reduction occurs over the same time period and is equivalent in amount to any direct emission reduction required pursuant to this division.

GHG reduction would begin in 2012 and are expected to increase by about 0.5 $MMTCO_2e$ per year until reaching the full implementation goal of 5 $MMTCO_2e$ per year in 2020. These reductions are consistent with the GHG emission reduction anticipated from this measure.

The State board shall rely upon the best economic and scientific information and its assessment of existing and projected technological capabilities when adopting the regulations required by the law.

ARB and CalRecycle staff used the best economic and scientific information available to develop the proposed regulation. CalRecycle entered into a contract with HF&H Consultants LLC (HF&H), to estimate the costs, cost savings, and net costs to collect, haul, process, and market varying amounts of targeted recyclable materials with high lifecycle GHG emission reduction potential. ARB staff developed California specific emission reduction factors for recyclable material based upon a life-cycle methodology that incorporates the avoided emissions from the manufacturing process, forest carbon sequestration, and transportation. In the case of compostable materials (food scraps, yard trimmings, grass, leaves, branches, and organic municipal solid waste), the fugitive

and process emissions from the composting process were subtracted from the potential GHG benefits of using compost.

E. Roles and Responsibilities

CalRecycle

As part of implementing the regulation, CalRecycle will provide technical assistance to local jurisdictions including training, model ordinances and contracts support, decision making tools, and other supporting resources. Additionally, CalRecycle staff provided ARB with proposed regulatory language consistent with the jurisdiction reporting and review process currently used to determine jurisdiction compliance with the existing, well-established AB 939 diversion mandates. Under the proposed regulation, jurisdictions will be required to report on their commercial recycling program implementation beginning with their 2012 Annual Report that is submitted August 1, 2013. Upon receipt of the Annual Reports, CalRecycle staff would then begin to evaluate program implementation efforts as part of each jurisdiction's overall AB 939 program evaluation.

For those jurisdictions on a two-year cycle, the first formal evaluation would begin in 2014 and continue every two years, and for jurisdictions on a four-year cycle, the evaluation would begin in the year 2016 and continue every four years thereafter. However, if at any time CalRecycle staff finds that a jurisdiction is not implementing a program in compliance with the regulation, CalRecycle may choose to conduct a compliance review anytime outside of the two and four-year review cycles. If CalRecycle determines that a jurisdiction has failed to meet its program obligations, CalRecycle would place the jurisdiction on a compliance order with a specific schedule for correcting any deficiencies. CalRecycle would subsequently determine whether the jurisdiction has complied with the terms of the compliance order. If a jurisdiction fails to comply with the terms of the compliance order, CalRecycle would take further enforcement action, including potential imposition of penalties under CalRecycle's established AB 939 procedures contained in section 41850 of the Public Resources Code. Although CalRecycle will implement the regulations and investigate potential violations, they may also refer cases of non-compliance to the Board for additional enforcement action. Further, ARB retains the oversight authority (section 95625) to enforce and subject violators to penalties for non-compliance as stated in HSC section 38580.

ARB

To ensure the successful implementation of the regulation, ARB will maintain ultimate responsibility for oversight of the regulation including levying civil penalties as needed pursuant to Part 6 of Division 25.5 of HSC (sections 38510 and 38580). In the event that any further regulatory actions are needed to ensure compliance with the proposed regulation, ARB staff will assist CalRecycle in enforcement or rule amendments.

II. EXISTING REGULATORY REQUIREMENTS

This chapter describes California statutory requirements related to this regulatory action for GHG emission reductions from municipal solid waste recycling. It also summarizes existing federal, state and local laws, rules, regulations and programs that may affect recycling activities at commercial businesses, public entities, or multifamily residences.

A. AB 32 Requirements and Criteria

AB 32, the Global Warming Solutions Act of 2006 (Núñez, Chapter 488, Statutes of 2006), directs the ARB to work with all agencies to reduce GHG emissions in California, with the overall goal of reducing statewide emissions to 1990 levels by the year 2020. For the solid waste sector, potential strategies to achieve GHG emission reductions include mandatory commercial solid waste recycling, landfill methane capture, organic waste diversion alternatives, and product stewardship. CalRecycle is the appropriate State agency to lead the development and implementation of the Commercial Recycling measure given its historical authority and expertise in solid waste management and recycling activities. However, the authority to adopt this GHG reduction measure lies with the ARB. The Commercial Recycling Regulation is designed to achieve GHG emissions reduction of 5 $MMTCO_2e$.

AB 32 includes provisions in HSC section 38562 that apply to regulations ARB adopts to reduce emissions towards the 2020 statewide GHG emission limit. Among other things, this section requires that reductions are real, permanent, quantifiable, verifiable, and enforceable. ARB is also required to adopt rules and regulations in an open, public process, considering issues such as environmental justice, cost effectiveness, and consistency with federal and state ambient air quality standards. Therefore, CalRecycle and ARB have taken specific steps to facilitate the proposed regulatory action's consistency with these broader criteria.

B. Summary of Relevant Statutes and Related Programs

In addition to the Commercial Recycling Regulation required by AB 32, there are a number of related federal programs, state laws, regulations, and rules relating to recycling in the commercial sector. Additionally, many local governments have taken a variety of approaches to regulating commercial recycling. There are, as detailed below, fundamental policy and program features that each has in common. How each are addressed locally depends on the types of businesses in the community, the local recycling infrastructure, access to markets, recycling space allocation, waste composition, and other factors. Therefore, a statewide Commercial Recycling Regulation needs to offer flexibility to address such variability while still reaching or exceeding the goal of 5 $MMTCO_2e$ reductions.

1. Federal

Solid waste reduction and recycling help address global climate change. The manufacture, distribution and use of products, as well as management of the resulting solid waste, all result in GHG emissions. Waste prevention and recycling reduce GHG emissions associated with these activities by saving energy, reducing methane emissions, and increasing forest carbon sequestration. As a result, many of the related federal resource conservation requirements that United States Environmental Protection Agency (U.S. EPA) implements and tools U.S. EPA uses apply to the broader national climate change initiative. The following are examples of federal requirements and related programs.

a. Climate Change

Executive Order 13514 on Federal Leadership in Environmental, Energy and Economic Performance (October 5, 2009) requires agencies to measure, manage, and reduce GHG emissions toward agency-defined targets. Agencies must meet a number of energy, water, and waste reduction targets, including increasing recycling and waste diversion to 50 percent by 2015.

b. Resource Conservation and Recovery Act

The *Resource Conservation and Recovery Act* (RCRA), an amendment to the Solid Waste Disposal Act, was enacted in 1976 to address increasing volumes of municipal and industrial solid and hazardous waste generated nationwide. Of the three interrelated RCRA programs, the solid waste program, under RCRA Subtitle D, is the most relevant to the proposed regulation. This program encourages states to develop comprehensive plans to manage non-hazardous industrial solid waste and municipal solid waste, sets criteria for municipal solid waste landfills and other solid waste disposal facilities, and prohibits the open dumping of solid waste.

c. Pollution Prevention Act of 1990

The *Pollution Prevention Act of 1990* established the national policy that pollution should be prevented or reduced at the source whenever feasible. Preventing pollution offers important economic benefits, as pollution never created avoids the need for associated investments in waste management or cleanup. The Pollution Prevention Act is also multi-media, in that it addresses water, air and land. As such, source reduction practices do not focus on treatment and disposal of waste from only one media, such as air. Instead, source reduction seeks to eliminate pollutants in all media – water, air and land. Such efforts also support national climate change goals.

d. Resource Conservation Challenge

Launched in 2002, the *Resource Conservation Challenge* (RCC) is a national program that provides renewed urgency to U.S. EPA's message of reducing, reusing, and recycling valuable materials habitually discarded by American industry and the general public by linking the importance of these activities to energy conservation and GHG reductions. One component of this program is a nationwide challenge for consumers, businesses, organizations, and industries to recycle 35 percent of America's municipal solid waste.

e. Federal Heavy Duty Truck Regulations

The federal government recently established fuel economy standards for heavy vehicles such as on-road heavy duty trucks, garbage trucks and buses. The standards were developed by the U.S Department of Transportation and the U.S. Environmental Protection Agency and require garbage trucks to meet a 10 percent reduction in fuel consumption for model year 2014-2018 vehicles. While the regulation targets the reduction of greenhouse gas emissions, an improvement in fuel efficiency will also reduce emissions of criteria pollutants such as NOx. These reductions will occur in the post 2014 timeframe and will help to mitigate any potential increase in emissions from waste collection vehicles that may result from implementation of the proposed regulation. More information on the Federal Heavy Duty Truck Regulations can be found at: http://www.epa.gov/otaq/climate/regulations.htm#1-2.

2. State

Statewide regulations and programs that would impact solid waste management, including recycling and its emissions are grouped under four categories: CalRecycle, ARB, local air districts, and local jurisdictions. Regulations and programs that pertain to each of the agencies are listed and discussed.

a. CalRecycle

In addition to being lead agency for implementing the Commercial Recycling Regulation under AB 32, CalRecycle enforces statutes and regulations which impact commercial solid waste management, including recycling. These requirements and programs are discussed below.

California Integrated Waste Management Act

CalRecycle administers the "California Integrated Waste Management Act (CIWMA) of 1989" and subsequent amendments, which establishes a 50 percent waste diversion mandate for local jurisdictions and state agencies and regulates their planning, implementation, and reporting efforts. Although this law does not specifically regulate the businesses targeted by the regulation, as a result of this Act, many local jurisdictions have instituted programs that support commercial recycling or regulate the commercial

sector. Despite this, much of the material disposed in landfills still originates from the commercial sector.

State Agency Model Integrated Waste Management Act

State agencies have requirements similar to jurisdictions under the CIWMA. Specifically, Assembly Bill (AB) 75, the State Agency Model Integrated Waste Management Act (Chapter 764, Statutes of 1999, Strom-Martin), establishes a 50 percent waste diversion mandate, and requires State agencies to develop and implement an integrated waste management plan and submit an annual report to CalRecycle summarizing progress in implementing its planned waste diversion programs. Community service districts providing solid waste services are also required by this Act to report disposal and diversion information to the city, county, or regional agency in which the community service district is located.

In 2008, the CIWMA was amended by the Solid Waste Per Capita Disposal Measurement Act (SB 1016, Wiggins, PRC Chapter 343, Statutes of 2008). This amendment changed the way local jurisdictions and State agencies measure their progress toward meeting the 50 percent statutory waste diversion mandates to a 50 percent equivalent per capita disposal target.

California Beverage Container and Litter Reduction Act

CalRecycle also administers the California Beverage Container Recycling and Litter Reduction Act of 1987, which subjects covered beverage containers to California Redemption Value (CRV). This CRV cash incentive has resulted in more than 200 billion aluminum, glass, and plastic beverage containers being recycled by businesses and individuals. Additionally, CalRecycle administers the beverage container recycling certification for recycling centers.

Source Reduction and Recycling Programs for Schools

Although California law does not mandate school district waste reduction program implementation, the California Education Code, sections 32370-32376, *encourages* school districts to establish and maintain a paper recycling program in all classrooms, administrative offices, and other areas owned or leased by the school district. CalRecycle is also required per PRC, sections 42620-42622 to provide assistance to school districts in establishing and implementing source reduction and recycling programs.

At-Store Recycling Program: Plastic Carryout Bags

CalRecycle is responsible for implementing the statewide plastic bag recycling program developed as a result of Assembly Bill (AB) 2449 (Levine), Chapter 845, Statutes of 2006, which as of July 1, 2007, requires stores set up an at-store recycling program for plastic carryout bags.

California's Rigid Plastic Packaging Container Law

CalRecycle enforces the Rigid Plastic Packaging Container (RPPC) law that was enacted in 1991 (PRC sections 42330 et seq.) to increase the use of recycled plastic and reduce the amount of plastic waste by regulating companies that produce or generate rigid plastic packaging products for sale in California.

Recycled-Content Trash Bag Program

CalRecycle monitors the provisions of the PRC with respect to plastic trash bag mandates. Manufacturers and wholesalers selling plastic trash bags in California must meet these minimum recycled content mandates annually. Manufacturers and wholesalers who fail to comply are considered noncompliant. Noncompliant companies are ineligible for the award of any State contract or subcontract, or for the renewal, extension, or modification of an existing State contract or subcontract for goods or services until CalRecycle determines the company is in compliance with the statutory and regulatory requirements of the plastic trash bag law.

Recycled-Content Newsprint Program

California law mandates the use of a specified amount of recycled-content newsprint by printers and publishers located in California, and, pursuant to PRC sections 42750, et seq., CalRecycle implements the program to encourage and track the use of recycled-content newsprint.

Related Activities

CalRecycle also offers a number of programs and continues to develop new tools that specifically target and support mandatory commercial recycling efforts statewide.

Cost Study on Commercial Recycling - An important consideration in implementing commercial recycling is the cost of such programs. CalRecycle's "Cost Study on Commercial Recycling" has provided two tools to help address this issue.

- *Cost Assessment Model* – This model provides an estimated range of the costs, savings and net costs related to developing or expanding selected commercial recycling programs.
- *Commercial Climate Calculator* - This tool is intended to support California businesses and multifamily properties in evaluating solid waste handling strategies, including disposal, recovery, and source reduction. The results of the analysis would address the relative financial, waste diversion, and climate impacts of a range of materials with high GHG intensity. CalRecycle plans to release this tool to support the implementation of the Commercial Recycling Regulation.

Implementation Tools for Mandatory Commercial Recycling -- In an effort to encourage expansion in commercial recycling programs and in partnership with CalRecycle, the *Institute for Local Government* has:

- Developed a sample ordinance that local jurisdictions may utilize when implementing mandatory commercial recycling (based on inventory and analysis of existing programs, stakeholder feedback, and case study);
- Conducted case studies of jurisdictions that have successfully developed and/or implemented a mandatory commercial recycling ordinance;
- Implemented a mandatory commercial recycling ordinance in at least one pilot community; and
- Developed a tiered recognition program for jurisdictions that have achieved actual emission reductions through implementation of a variety of actions, including solid waste management programs. (For more information: http://www.ca-ilg.org/samplecomrecycord)

Recycling and Waste Management Infrastructure Project - To address the impact on the existing solid waste management and recycling infrastructure, CalRecycle's Recycling and Waste Management Infrastructure Project is aimed at providing a centralized source of information on California waste management and recycling facilities. When completed, this tool will be helpful in determining if future material generation amounts or programs under consideration for implementation or expansion could be supported within the existing regional processing facility capacity limits and/or require the need for expansion of the infrastructure. More information on the Recycling and Waste Management Infrastructure Project can be found at http://www.calrecycle.ca.gov/Infrastructure/Project.

Recycling Market Development Zone – CalRecycle's Recycling Market Development Zone (RMDZ) program combines recycling with economic development to create new businesses, expand existing ones, create jobs, and divert waste from landfills. The zones cover roughly 72,000 square miles of California from the Oregon border to San Diego. This program provides attractive loans, technical assistance, and free product marketing to businesses that use materials from the waste stream to manufacture their products and are located in a zone. Additionally, CalRecycle offers free product marketing through the RecycleStore and Recycled-Content Product Directory. Assistance is provided by local Zone Administrators and CalRecycle's Local Assistance and Market Development and Financial Resources Management Branches. Local incentives vary from jurisdiction to jurisdiction; and may include relaxed building codes and zoning laws, streamlined local permit processes, reduced taxes and licensing, and increased and consistent secondary material feedstock supply. More information on RMDZ can be found at http://www.calrecycle.ca.gov/RMDZ/.

Waste Reduction Awards Program - The Waste Reduction Awards Program (WRAP) is administered by CalRecycle and provides an opportunity for California businesses and

nonprofit organizations to gain public recognition for their outstanding waste reduction efforts and lets the community know your business takes waste reduction seriously. WRAP also provides businesses with examples of successful waste reduction techniques which they may adopt as their own. More information on WRAP can be found at http://www.calrecycle.ca.gov/wrap/.

CalRecycle offers a host of additional programs and services that relate to business waste reduction, including recycling. These resources range from guidance documents and funding opportunities to educational and promotional materials. CalRecycle is also in the process of consolidating these resources into a general business assistance portal.

b. ARB

ARB regulations that may impact the recycling industry are discussed below. These requirements will require diesel vehicles that are involved with transportation of waste and recyclables to significantly reduce their overall emissions by 2023 through a mix of retrofit controls and new vehicles.

The Solid Waste Collection Vehicle Rule

Diesel Particulate Matter Control Measure for On-road Heavy-duty Diesel-fueled Residential and Commercial Solid Waste Collection Vehicles (The Solid Waste Collection Vehicle Rule or rule) is codified in CCR, title 13, sections 2020, 2021, 2021.1, and 2021.2. The Solid Waste Collection Vehicle Rule was adopted by ARB in 2003 to reduce emissions of diesel particulate matter (PM), oxides of nitrogen (NO_x), and other criteria pollutants from in-use diesel solid waste collection trucks that operate in California. The rule will achieve a reduction in toxic PM emissions from collection vehicles by as much as 85 percent by 2015 from levels that existed in 2000. Because of this rule, more than two million pounds of diesel PM and 30,000 tons on NO_x would not be released into the air. More information on the Solid Waste Collection Vehicle Rule can be found at http://www.arb.ca.gov/msprog/swcv/swcv.htm.

The Regulation for In-Use On-Road Diesel Vehicles

The Regulation for In-Use On-Road Diesel Vehicles (Truck and Bus regulation) is codified in CCR, title 13, section 2025. The Board adopted the Truck and Bus regulation to reduce emissions of diesel PM, NO_x, and other criteria pollutants from in-use diesel trucks and buses that operate in California. The emissions reductions anticipated from this regulation are estimated to be 124 tons per day of NO_x and 12.8 tons per day of PM by 2014. More information on the Truck and Bus regulation can be found at http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm.

The Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Regulation

The Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Regulation (Tractor-Trailer GHG regulation) is codified in CCR, title 17, sections 95301 to 95307, 95309, and 95311. The Tractor-Trailer GHG regulation reduces GHG and NOx emissions from new and existing 53-foot or longer box-type trailers and the tractors that haul such trailers by requiring them to utilize technologies that would result in improved fuel efficiency. This regulation is one of the measures identified to reduce GHG emissions and contributes towards meeting the GHG emission reduction goals of AB 32. The emissions reductions anticipated from this regulation in California are estimated to be 1 $MMTCO_2e$ per year and 1.4 tons of NO_x per day by 2020. More information on the Tractor-Trailer GHG regulation can be found at http://www.arb.ca.gov/cc/hdghg/hdghg.htm.

In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks Regulation

The In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks Regulation (Drayage Truck Regulation) is codified in CCR, title 13, section 2027. The Drayage Truck Regulation was adopted by the ARB to reduce diesel PM and NO_x emissions from drayage trucks operating at California's ports and rail yards. More information on the Drayage Truck Regulation can be found at http://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm.

Landfill Methane Control Measure

The measure to reduce Methane Emissions from Municipal Solid Waste Landfills (Landfill Methane Control Measure) is codified in CCR, title 17, sections 95460 to 95476. The Landfill Methane Control Measure reduces emissions of methane, a GHG, from MSW landfills. More information on the Landfill Methane Control Measure can be found at http://www.arb.ca.gov/cc/landfills/landfills.htm.

c. Local Air Districts

Local Air Districts have adopted rules for controlling criteria pollutant and air toxic pollutant emissions. Local air districts set operational rules (i.e., New Source Review rules) and emissions limitations for any business which emit significant amounts of criteria pollutants and/or air toxic pollutants. Two of the largest districts, the South Coast Air Quality Management District (Rules 1133.1, 1133.2, 1133.3) and the San Joaquin Valley Air Pollution Control District (Rules 4565, 4566), have composting rules that focus on the control of volatile organic compound (VOC), ammonia, and PM emissions. The Antelope Valley Air Pollution Control District has similar composting rules as well (Rule 1133).

d. Local Jurisdictions

Local jurisdictions have implemented various types of collection and recycling programs, most initially aimed at achieving compliance with AB 939, the 50 percent diversion mandate. While source-separated recycling collection was the norm in the 1990s (three-bin carts, wet/dry collection), increasingly alternatives such as single-stream (all recycling in one container and solid waste/refuse in another) and mixed waste processing (solid waste is sent to a processing facility for sorting out recyclables/compostables) have been emerging as viable options as well.

About 10 percent of California cities and counties have already implemented mandatory commercial recycling programs. Commercial recycling services and programs provided by the public and private sector are available throughout the state, but many businesses have not chosen to participate or do not participate fully.

In terms of overall policy and program design, local jurisdiction mandatory commercial recycling programs can vary substantially. Variables include:

- The types and sizes of businesses.
- The amount and types of material generated.
- The regulated entity, the hauler, or business generators.
- The origin of the program (e.g. approved regulation, ordinance, or voluntary or incentive based)
- The methods for monitoring and determining compliance.

Other important factors that play into a mandatory commercial recycling program design include available funding, space constraints, access to processing facilities and markets. Appendix B summarizes mandatory commercial recycling programs from 46 California jurisdictions. Review of these programs identified the wide range of approaches and circumstances that must be taken into consideration in drafting a Commercial Recycling Regulation; this is one of the primary reasons why the proposed regulation affords local jurisdictions considerable flexibility in designing and implementing such programs.

III. SUMMARY OF THE PROPOSED REGULATION

This chapter provides a summary and the key components of the proposed Commercial Recycling Regulation. This chapter is also intended to satisfy the requirements of Government Code section 11346.2, which requires that a non-controlling "plain English" summary of the regulation be made available to the public. Additionally, this chapter pursuant to Government Code sections 11349.1, and 11346.2(b)(1), and title 1, CCR, section 10, describes the rationale for each proposed section of the regulation. This chapter also discusses alternatives considered during the development of the proposed regulation. The complete text of the proposed Commercial Recycling Regulation is provided in Appendix A.

A. Components of the Proposed Regulation

The purpose of the proposed regulation is to reduce greenhouse gas emissions by increasing the amount of commercial waste recycled in California, specifically by requiring businesses, multifamily residences with 5 or more units, and public entities that generate 4 cubic yards or more of solid waste per week to recycle. Increasing diversion of 1.7 million tons of commercial solid waste through recycling will reduce greenhouse gas (GHG) emissions by 5 million metric tons of carbon dioxide (CO_2) equivalents ($MMTCO_2e$) per year by 2020. It will also expand the opportunity for additional recycling services and recycling manufacturing facilities in California. Additionally, local jurisdictions would be required to provide education and outreach to affected businesses and to monitor compliance with the proposed regulation. The proposed regulation includes the following components:

- Requires businesses, multifamily complexes of 5 or more residential units, and public entities, that generate 4 cubic yards or more of trash per week to recycle solid waste that they generate by selecting one, or any of combination of the following: subscribing to a recycling service, source separating their material and self-hauling to a recycling facility, allowing for the pick-up of recyclables, and/or having their material processed in a mixed waste processing facility that yields diversion results comparable to source separation.

- Requires each local jurisdiction, regardless of whether the jurisdiction has met its AB 939 50 percent diversion requirement, to implement a commercial recycling program by July 1, 2012, that provides education, outreach and monitoring of businesses subject to the Commercial Recycling Regulation. If a jurisdiction already has a commercial recycling program that targets businesses required to comply with the regulation, and if the program includes education, outreach, and monitoring elements, it would not be required to implement a new or expanded program. Jurisdictions are required to provide education/outreach/monitoring to inform businesses of their obligation to recycle. However, enforcement by local jurisdictions is not required, and jurisdictions do not need to have legal control over the businesses.

- Establishes general criteria for education and outreach to provide information explaining the requirements of the Commercial Recycling Regulation, as well as the recycling opportunities available within the jurisdiction. Jurisdictions have flexibility to conduct education and outreach that fits their existing programs and resources. For example, the jurisdiction may choose whether they or the hauler(s) or community groups conduct these activities, or they may choose a combination. Jurisdictions are also encouraged to utilize existing programs to incorporate information about the new state requirement, such as an existing website, newsletter, etc., to maximize outreach opportunities.

- Establishes general criteria for monitoring of affected businesses (businesses, multifamily complexes of 5 or more residential units, and public entities that generate 4 cubic yards or more of trash per week) and includes assessing if affected businesses are subscribing to and participating in recycling services, and notifying affected businesses that are not in compliance with these regulations. This is necessary to ensure that affected businesses that are required by these regulations to recycle commercial waste are identified and monitored, and that they are notified if not in compliance. Jurisdictions have flexibility to implement monitoring that fits their existing programs and resources. For example, the jurisdiction may choose whether it and/or the hauler(s) conduct these activities. Jurisdictions are encouraged to utilize existing programs to inform businesses of the state requirement to recycle, such as letters that are sent to businesses, on-site visits, phone calls from the hauler's sales representative, or other approaches to maximize resources. Jurisdictions might also choose to phase in monitoring over time depending on how many businesses are in the jurisdiction.

- Identifies commercial recycling program options that may be used by local jurisdictions to implement the regulation including: implementing a mandatory commercial recycling policy or ordinance, requiring mandatory commercial recycling through the franchise contract or agreement, and/or requiring that all commercial recycling materials go through a mixed waste processing system that yields diversion results comparable to source separation.

- Allows jurisdictions the flexibility to implement a commercial program that meets their local needs and works with their existing infrastructure. For example, a jurisdiction's recycling program may include an enforcement component; the enforcement component may include all businesses subject to a jurisdiction's recycling program or a subset of these businesses; and, a jurisdiction's recycling program may apply to businesses beyond those as defined in this regulation.

- Recognizes rural jurisdictions' limitations (such as small geographic size, low population density, or distance to markets) when CalRecycle evaluates program implementation and makes a determination regarding whether a rural jurisdiction is making a "good faith effort" to implement a commercial recycling program.

- Protects existing franchise agreements, contracts, licenses, and the right of businesses to sell or donate recyclable materials.

- Allows property owners of multifamily complexes to comply with requirements by requiring, if needed, tenants to source separate their recyclable materials.

- Makes CalRecycle responsible for evaluating and enforcing jurisdiction performance in implementing the mandatory commercial recycling program, and for measuring GHG emissions reductions associated with commercial recycling at the statewide level.

- Provides ARB with the ultimate authority for oversight and implementation of the proposed regulation, including, if required, use of ARB's statutory enforcement procedures.

B. Requirements of the Proposed Regulation

The following paragraphs provide a plain English description of each of the sections of the proposed regulation.

1. Purpose (section 95620)

The purpose of this Article is to implement the Mandatory Commercial Recycling regulation pursuant to Sections 38561 and 38562 of the Health and Safety Code to reduce GHG emissions. The purpose of this regulation is to reduce these GHG emissions by diverting commercial solid waste that would otherwise be landfilled to recycling and composting efforts and to expand the opportunity for additional recycling services and recycling manufacturing facilities in California. This could provide increased feedstock for California recycling manufacturing facilities.

2. Definitions (section 95621)

Section 95621 is necessary to explain a number of technical and administrative terms from the PRC that appear in this Article that are not contained in the Health and Safety Code and therefore, require definition to ensure regulatory consistency and clarity.

Subsection 95621(a)
Because this proposed regulation will be adopted pursuant to AB 32 and appear in the regulations adopted by ARB, for convenience and to ensure regulatory consistency and clarity, subsection (a) is necessary to explain that, except as specifically noted in the proposed regulation, the technical and administrative terms in this Article incorporate the definitions of those terms that appear in the PRC sections pertaining to CalRecycle.

Subsection 95621(b)
Subsection (b) is necessary to define the technical and administrative terms that appear in this Article that require definition. Except as otherwise noted, the definitions of this Article are governed by the definitions set forth in Chapter 2 (commencing with section 40100), Part 1, Division 30 of the PRC.

Subsection (b)(1)
Subsection (b)(1) defines the term "Annual Report." This subsection is necessary to clarify the type of report required and the method in which it is to be submitted, which is electronically.

Subsection (b)(2)
Subsection (b)(2) is necessary to clarify that the term "CalRecycle" used in this Article means the Department of Resources Recycling and Recovery.

Subsection (b)(3)
Subsection (b)(3) defines the term "Jurisdiction." This subsection is necessary to clarify which types of governmental entities are subject to the requirements of section 95623 through section 95625.

Subsection (b)(4)
Subsection (b)(4) defines the term "Business." This subsection is necessary to clarify which types of commercial or public entities are subject to the requirements of this Article, and to explicitly state that public entities are included. Public entities include military installations, school districts, schools, federal, state, local, regional agencies or facilities, special districts, California State Universities, Universities of California, and community colleges. Additionally, the definition of business includes strip malls containing two or more commercial entities and industrial facilities.

This also clarifies that the threshold for businesses and multifamily residences of 5 units or more is 4 cubic yards of commercial solid waste per week, not 4 cubic yards of commercial solid waste and recyclables. The definition distinguishes between recyclable materials that already are separated prior to any commercial solid waste being discarded – and thus excluded from the 4 cubic yards – versus potentially recyclable materials that are not separated and instead are included in the commercial solid waste being discarded. Establishing the threshold to include only commercial solid waste should make it easier for a jurisdiction to determine which businesses are subject to the regulation; a jurisdiction does not have to conduct a waste generation study to determine if 4 cubic yards of commercial solid waste is generated. Within this definition then, the term "generates" simply refers to commercial solid waste produced and disposed, excluding previously separated recyclable materials; it does not refer to other uses of the terms "generates" or "generation" that mean the amount of commercial solid waste diverted plus the amount of solid waste disposed.

Subsection (b)(5)
Subsection (b)(5) defines the term “Commercial solid waste.” This subsection is necessary to clarify the types of material that shall be recycled in order to meet the requirements of this Article. Also, to complement and reinforce the affected Business definition, it was necessary to clarify that commercial solid waste does not include solid waste from single family residences or multifamily residences of less than 5 units.

Subsection (b)(6)
Subsection (b)(6) defines the terms “Diversion” or “divert.” This subsection is necessary to clarify the required end result of a jurisdiction’s implementation of its commercial recycling program, specifically to reduce the amount of solid waste being disposed of in landfills.

Subsection (b)(7)
Subsection (b)(7) defines the term “Disposal.” This subsection is necessary to inform businesses as to how materials can be disposed and ensure regulatory clarity and consistency with CalRecycle Statutes and regulations.

Subsection (b)(8)
Subsection (b)(8) defines the term “Franchise.” This subsection is necessary to clarify that the existing contractual and other legal obligations between a jurisdiction and a hauler to transport solid waste would not be modified or abrogated by this Article. For purposes of these regulations, the definition for “Franchise” is limited to commercial solid waste to differentiate them from other types of franchises.

Subsection (b)(9)
Subsection (b)(9) defines the term “Hauler.” This subsection is necessary to clarify the action required of businesses regarding movement of commercial solid waste. This action includes either self-haul or subscribing to a service that hauls.

Subsection (b)(10)
Subsection (b)(10) defines the term “Landfill.” This subsection is necessary to inform businesses about the type of disposal facility that accepts solid waste and ensure regulatory clarity and consistency with CalRecycle Statutes and regulations.

Subsection (b)(11)
Subsection (b)(11) defines the term “Mixed Waste Processing.” This subsection is necessary to clarify that the option for a business to subscribe to a recycling service that includes mixed waste processing means a service that processes solid waste that contains both recyclable and/or compostable materials and trash. This is necessary to provide specificity on materials management options that a business can take.

Subsection (b)(12)
Subsection (b)(12) defines the terms “Recycle” or “recycling.” This subsection is necessary to clarify the type of program a business shall undertake and a jurisdiction shall implement to satisfy the requirements of this Article; and to assure regulatory

clarity and consistency with existing definitions in CalRecycle regulations. For purposes of this regulation, this is necessary to clarify that recycling does not include transformation as defined in PRC 40201. However, this does not prohibit commercial solid waste from being sent to transformation facilities as long as the existing requirement is met regarding front-end processing to remove recyclable materials to the maximum extent feasible, and it does not change the provision that allows jurisdictions to use transformation to satisfy up to a maximum of 10 percent of their per-capita disposal rate.

Subsection (b)(13)
Subsection (b)(13) defines the terms “Recyclables” and “recyclable materials.” This subsection is necessary to clarify what materials are considered as being subject to or able to be counted toward compliance with the regulation.

Subsection (b)(14)
Subsection (b)(14) defines the terms “rural city” and “rural county" and "rural regional agency.” The subsection is necessary to clarify which jurisdictions are considered rural and therefore subject to consideration of additional factors in determining whether the jurisdiction is making a “good faith effort” to implement a commercial recycling program.

Subsection (b)(15)
Subsection (b)(15) defines the terms “Self hauler” or “self-hauling.” This subsection is necessary to add clarity to an option for a business to consider for meeting the requirement to recycle its commercial solid waste. One option is transporting its own waste to a recycling facility.

Subsection (b)(16)
Subsection (b)(16) defines the terms “Source separating” or “source separation.” This subsection is necessary to clarify the process required of the owner or operator of a business to recycle its commercial solid waste when choosing the option described in subsection 95622(a) to either self-haul or subscribe to a service that hauls, or arrange for the pickup of the recyclable materials separately from the solid waste to divert them from disposal.

Subsection (b)(17)
Subsection (b)(17) defines the term “Solid waste.” This subsection is necessary to define the types of materials subject to requirements of this Article and to assure regulatory clarity and consistency with the definitions in CalRecycle regulations.

Subsection (b)(18)
Subsection (b)(18) defines the term “Transformation.” This subsection is necessary to clarify that there is no change to the existing interpretation of requirements about transformation in section 41783 of the PRC.

3. Mandatory Recycling of Commercial Solid Waste by Businesses (section 95622)

Section 95622 specifies the requirements a business shall meet to recycle its commercial solid waste.

Subsection (a)
Subsection 95622(a) specifies a business shall reuse, recycle, compost, or otherwise divert its commercial solid waste from disposal by one or any combination of the following materials management options described in subsection 95622(a)(1) or subsection 95622(a)(2). This is necessary to define the party responsible for recycling commercial solid waste.

Subsection (a)(1)
Subsection (a)(1) specifies methods that a business may take to meet the requirement of this Article to recycle the business' commercial solid waste: by source separating recyclable and/or compostable materials, alone or in combination with other programs, activities or processes that divert recyclable and/or compostable materials, and self-hauling these separately from the solid waste to a recycling facility; and/or subscribing to a hauler that transports these source-separated recyclable materials to a recycling facility; and/or otherwise arranging for the pick-up of recyclables (e.g., by independent recyclers). This is necessary to inform business owners, operators, and employees of actions they may take to meet the requirement that commercial solid waste generated as part of business operations is recycled.

Subsection (a)(2)
Subsection (a)(2) specifies a method that a business may take to meet the requirement of this Article to recycle the business's commercial solid waste: by subscribing to a recycling service that includes mixed waste processing as part of a system in combination with other programs, activities, and processes that diverts recyclable and/or compostable materials from disposal, yielding diversion results comparable to source separation (note: CalRecycle intends that the phrase "other programs, activities and processes" associated with a material recovery facility, including a mixed waste processing facility, applies to the commercial solid waste or recyclable materials after they are generated by the business, not to waste minimization or source reduction programs and activities). Mixed waste processing is intended here to include a myriad of processes to recover recyclable and/or compostable materials from solid waste. This Subsection is not intended to change marketplace dynamics or express a preference for any particular diversion activity, program or process over another. It is intended to provide local governments with flexibility in designing programs specific to their community. However, while no single quantitative recovery rate standard exists, the section does establish an expectation that overall diversion results from a recycling system that includes mixed waste processing, and that may include other programs and activities, will be comparable to the overall diversion results of recycling services that rely on source-separated processing of recyclables, and that may also include other programs and activities. The diversion performance of a particular facility will be

considered by CalRecycle on a case-by-case basis as part of its evaluation of local jurisdiction program implementation to see if its recovery appears to be significantly low. In this case CalRecycle would take into account relevant factors such as, but not limited to, the character and composition of the solid waste stream generated in the jurisdiction, the nature of collection systems in the jurisdiction, and the nature and amount of feedstock processed at facilities used for solid waste generated in the jurisdiction. That is, CalRecycle would conduct a case-by-case qualitative evaluation in the context of the entire set of programs in a jurisdiction, whether the facilities involved are mixed waste processing or single-stream material recovery facilities. This is necessary to provide information to business owners, operators, and employees with another option to meet the requirement to recycle commercial solid waste

Subsection (b)
Subsection (b) clarifies that property owners of multifamily complexes may require tenants to source separate their recyclable materials. Tenants in multifamily complexes must source separate their recyclable materials if required by the property owner. This provision is necessary to ensure that owners can require those persons actually generating recyclable materials and therefore in an opportune position to source separate, them to do so.

Subsection (c)
Subsection (c) specifies that each business is responsible for ensuring and demonstrating compliance with the requirements of section 95622. It also specifies that the activities a business undertakes pursuant to subsection 95622(a) shall be consistent with local requirements, including, but not limited to, a local ordinance or agreement applicable to the collection, handling or recycling of solid waste. This is necessary to inform businesses of their responsibilities to ensure and demonstrate compliance with the commercial recycling requirement. In addition, this allows a jurisdiction to determine whether or not a business is in compliance with the commercial recycling requirements of this Section and for an implementing or enforcing agency to take further implementation or enforcement action as appropriate.

Subsection (d)
Subsection (d) specifies that except as expressly set forth in subsection 95622(e)(3), the authority of a jurisdiction is not limited by this section and that it may adopt, implement, or enforce a more stringent or comprehensive recycling program and that businesses located in such a jurisdiction are required to comply with local requirements. This is necessary to inform affected parties that in regards to more stringent or comprehensive recycling programs, a local jurisdiction is not limited by the statewide requirements for a business to recycle its commercial solid waste. It is also necessary to inform businesses that they shall, at a minimum, comply with the more stringent local requirements if applicable. This allows jurisdictions a level of autonomy to adopt, implement, or enforce more stringent or comprehensive recycling programs more suited to local conditions.

Subsection (e)
Subsection (e) specifies that legal mechanisms and rights described in this Subsection shall not be modified or abrogated by section 95622. This is necessary to assure relevant parties that this subsection does not affect legal mechanisms and rights.

Subsection (e)(1)
Subsection (e)(1) specifies that a franchise agreement granted or extended by a city, county, or other local government agency cannot be modified or abrogated by section 95622. This is necessary to assure franchisees that this section does not modify or abrogate a franchise agreement granted by local government. This offers protection to the franchisee from the threat of unforeseen and disruptive changes to an existing franchise agreement.

Subsection (e)(2)
Subsection (e)(2) specifies that a contract, license, or permit to collect solid waste previously granted or extended by a city, county, or other local government agency cannot be modified or abrogated by section 95622. This is necessary to ensure that this section does not modify or abrogate a contract, license, or permit to collect solid waste granted by local government. This offers protection from the threat of unforeseen and disruptive changes to an existing contract, license, or permit to collect solid waste.

Subsection (e)(3)
Subsection (e)(3) specifies that nothing in these regulations is intended to prevent or otherwise regulate the right of a business as provided in section 41952 of the Public Resources Code. This subsection references statute that protects a business from being required to sell or exchange its recyclable materials at less than fair market value, and allows a business to donate its recyclable materials to another entity for reuse or recycling prior to discarding them. This subsection does not include explanatory language related to statute and subsequent case law, because that is outside of the scope and purpose of these regulations. Therefore, the language in these regulations is limited to clarifying that the regulations are not intended to change statute or case law. The purpose of these regulations has never been, nor would it be appropriate for them, to describe or articulate what the franchise or collection rules are. This is more properly left to statute and the cases that interpret them. Any attempt to “codify” these rules or decisions in regulations is unnecessary for the purpose they are meant to accomplish and leaves open the possibility of them being viewed as inconsistent with statute and case law.

Subsection (e)(4)
Subsection (e)(4) clarifies that interpretation of the provisions of Public Resources Code section 41783 are not affected by this regulation. Commercial solid waste may be taken to a transformation facility, as long as the existing requirement in Public Resources Code section 41783 for front-end processing to remove recyclable materials to the maximum extent feasible is met. For example front-end processing includes source-separating recyclables or processing material at a mixed waste processing facility. The subsection clarifies that there is no change to the existing provisions of

section 41783 of the Public Resources Code related to transformation that allow jurisdictions to reduce their per-capita disposal rate by no more than 10 percent.

4. Implementation of Commercial Recycling Program by Jurisdictions (section 95623)

Section 95623 specifies the requirements a jurisdiction shall meet to implement a commercial recycling program, which are necessary to ensure that affected businesses are aware of their requirements to recycle and are doing so.

Subsection (a)
Subsection (a) specifies that effective July 1, 2012, each jurisdiction shall implement a commercial recycling program that diverts commercial solid waste generated by businesses, as defined in subsection 95621(b)(4). Education and outreach consists of informing businesses of the state requirement to recycle and providing information on how businesses can recycle. Monitoring entails assessing whether businesses are recycling and, if not, informing them again of the requirement. This is necessary to define the party responsible and timeline for implementing a commercial recycling program.

Subsection (b)
Subsection (b) specifies that, in addition to the businesses defined in subsection 95621(b)(4), the businesses subject to commercial recycling may also include any other commercial entity that the jurisdiction identifies as being a source of commercial solid waste. This section is necessary to allow jurisdictions the flexibility to enact ordinances, rules or policies to make commercial recycling applicable to other commercial entities that are sources of recyclable materials within the jurisdiction and that otherwise do not meet the subsection 95621(b)(4) definition of business.

Subsection (c)
Subsection (c) specifies that a jurisdiction may determine the specific material types included in its commercial recycling program and provide a non-exclusive list of the types of materials that could be considered for inclusion. This is necessary to ensure that a jurisdiction has flexibility to target specific material types for inclusion in its commercial recycling program which, based on local conditions, may differ from other jurisdictions.

Subsection (d)
Subsection (d) specifies that if, prior July 1, 2012, a jurisdiction has implemented a commercial recycling program that meets the requirements of this Article, the jurisdiction will not be required to implement a new or expanded program. In the event a jurisdiction's existing recycling program does not include all businesses as defined in this regulation, or the monitoring, outreach and education requirements of this Article, the program will need to be revised to do so. This is necessary to protect jurisdictions that already implemented suitable commercial recycling programs from being required to implement a new program.

Subsection (e)
Subsection (e) makes it explicit that if, in order to satisfy the requirements of this Article, a jurisdiction has to implement a new, or expand an existing, commercial recycling program, it shall not be required to revise its source reduction and recycling element nor comply with the requirements of PRC section 41800 et seq. In addition, this subsection specifies that the jurisdiction shall include the addition or expansion of a commercial recycling program in its electronic annual report. This is necessary to ensure CalRecycle is provided information annually on jurisdictions' implementation of their commercial recycling programs, but offers relief to jurisdictions by exempting them from the statutory requirement to revise Source Reduction and Recycling Elements when implementing a new, or expanding an existing, commercial recycling program.

Subsection (f)
Subsection (f) specifies that the recycling program adopted pursuant to subdivision (a) may include, but is not limited to, implementing a commercial recycling policy or ordinance requiring businesses to recycle; requiring a mandatory commercial recycling program, through a franchise agreement or contract; or, requiring that commercial solid waste from businesses be sent to a mixed waste processing facility. This is necessary to inform jurisdictions of optional components that may be included in a recycling program.

Subsection (f)(1)
Subsection (f)(1) clarifies that as part of developing a commercial recycling program a jurisdiction needs to consider whether an exemption is warranted for multifamily complexes that lack sufficient space to provide additional recycling bins. This is necessary to clarify that multifamily complexes would not necessarily be required to conduct recycling if the jurisdiction includes this exemption.

Subsection (g)
Subsection (g) specifies that the commercial recycling program shall include education and outreach to businesses and that the jurisdiction shall determine the types of educational and outreach programs to ensure that the program targets the components of the jurisdiction's commercial waste stream. This is necessary to ensure affected businesses are adequately informed about a jurisdiction's commercial recycling program, their requirements to recycle, and the components of the solid waste stream that the jurisdiction has targeted. While specific elements of a jurisdiction's education and outreach program will be unique, the following are examples of what jurisdictions could do annually to inform and educate businesses about the state requirement and how the businesses can comply.

1) Electronic: Place information on the jurisdiction's website that informs businesses of the state requirement to recycle and explains how businesses can recycle in the jurisdiction. The information placed on the website could include contact information for the franchise hauler for service information, locations to self-haul recyclables to, and other relevant information.

2) Print: Send out information to the affected businesses via a brochure, letter, or newsletter. At a minimum, this information should be sent annually, but could be done more frequently.
3) Direct Contact: Present at business forums, such as the Chamber of Commerce, and/or provide technical assistance through waste assessments to explain the state requirement and how businesses can recycle in the jurisdiction. Provide a contact person that businesses can call to ask questions.

The following provides guidance to rural jurisdictions that may have unique circumstances due to small geographic size and/or low population density:

- rural jurisdictions could include information in its annual letter to businesses for business license renewals about the requirement for businesses to recycle and how businesses can recycle in the rural jurisdiction.

A jurisdiction may choose whether the jurisdiction itself and/or hauler(s) conduct these activities. Jurisdictions are also encouraged to utilize existing programs to incorporate information about the new state requirement to maximize resources, such as utilizing an existing website, newsletter, and/or other existing media.

Jurisdictions also may choose to phase in education/outreach to multifamily complexes depending on the jurisdictions infrastructure, mechanisms for communicating with multifamily complexes, etc. For example, recognizing that multifamily units of 16 or more by law are required to have an on-site manager, a jurisdiction has the flexibility to target those units first. Jurisdictions also have the flexibility in how they develop and implement the education/outreach to owners of multifamily complexes. For example, if multifamily complexes have owners that are located in other areas of the state or live outside of the state, then the jurisdiction might take various approaches to contacting the owner to inform them of the state requirement to recycle at the complex, such as sending a letter, including information on the solid waste bill, etc.

Subsection (h)
Subsection (h) specifies that the commercial recycling program shall include identification and monitoring of businesses, to assess if businesses are complying with subsection 95622(a). In addition, this subsection specifies that the jurisdiction shall, at a minimum, notify businesses that are not in compliance with these regulations. This is necessary to ensure that businesses required by these regulations to recycle commercial solid waste are identified and monitored, and that they are notified if not in compliance. While specific elements of a jurisdiction's monitoring program will be unique, the following are examples of what jurisdictions could do annually to notify businesses that are out of compliance with the state requirement and how the businesses can comply. The jurisdiction may choose whether the jurisdiction and/or hauler(s) conduct these activities. Jurisdictions are encouraged to utilize existing programs to incorporate information about the new state requirement, such as letters that are sent to businesses, notifications sent electronically, on-site visits, phone calls from the hauler's sales representative, etc., to maximize resources. Jurisdictions might

also choose to phase in monitoring depending on how many businesses are in the jurisdiction, including phasing in monitoring to focus first on multifamily residences with 16 units or more.

Examples related to monitoring include the following:

1) The jurisdiction, if it is a city run program, or the franchise hauler(s) would track businesses and report to the jurisdiction on those businesses that are not recycling.
2) For those businesses that are not complying, either the jurisdiction or the hauler would send a notice to the business to inform them of the state requirement and how the business can recycle in the jurisdiction.

An additional approach to monitoring that jurisdictions might choose is the following:

3) Either the hauler or the jurisdiction could follow-up in person or with a phone call with the businesses that are not in compliance with the state regulation. The purpose of this follow-up would be to assist the business with identifying how it can recycle in the local jurisdiction.

The following provides guidance regarding monitoring to rural jurisdictions that may have unique circumstances due to small geographic size and/or low population density:

1. For jurisdictions that have staff or a hauler that services commercial businesses, the staff and/or hauler could identify the businesses that aren't recycling and then the jurisdiction would send out a letter that explains the state requirement that businesses recycle and how the businesses can recycle in the jurisdiction.
2. For jurisdictions that do not have staff and/or a hauler to do (1) above and because it might be difficult for the jurisdiction to ascertain which businesses are not recycling, then an annual letter would suffice. The letter could be sent electronically or hard copy depending upon the rural jurisdiction's situation.

Subsection (i)
Subsection (i) suggests a non-exclusive list of additional components that the recycling program may include. This is necessary to inform jurisdictions of different types of components that can contribute to an effective recycling program.

Subsection (i)(1)
Subsection (i)(1) specifies that an additional component of the recycling program may include, but is not required to include, enforcement. If an enforcement component is implemented, jurisdictions may include, a penalty or fine structure that, consistent with a jurisdiction's authority, incorporates warning notices, civil injunctions, financial penalties, or criminal prosecution. In addition, this subsection specifies that consistent with a jurisdiction's authority any fees or penalties generated by the enforcement program could, in the jurisdiction's discretion, be used to pay program costs.

This subsection is necessary to inform jurisdictions of a type of component that can contribute to an effective recycling program. In developing compliance criteria for an enforcement program, a jurisdiction could consider a multifamily complex owner's effort to comply with recycling requirements. Criteria for exempting a multifamily complex owner from enforcement penalties could include the owner not being able to get a hauler to provide recycling services to the complex, or the efforts the owner has made to address tenants' refusal to source separate their recyclables.

Subsection (i)(2)
Subsection (i)(2) specifies that an additional component of the recycling program may include building design standards that specify space requirements for storage of recyclables or other purposes that may assist businesses with compliance with the program. This is necessary to inform jurisdictions of a type of component that can contribute to an effective recycling program.

Subsection (i)(3)
Subsection (i)(3) specifies that an additional component of the recycling program may include exemptions deemed appropriate by the jurisdiction including, but not limited to, zoning requirements, lack of storage space, lack of markets, non-generation of recyclable materials, or current implementation by a business of actions that result in recycling of a significant portion of its commercial waste. This is necessary to inform jurisdictions of a type of component that can contribute to an effective recycling program.

Subsection (i)(4)
Subsection (i)(4) specifies that an additional component of the recycling program may include certification requirements for self-haulers which may include, but are not limited to, requiring businesses to maintain written records demonstrating that all self-hauling activities have been completed in accordance with the standards imposed by the jurisdiction's commercial recycling program. This is necessary to inform jurisdictions of a type of component that can contribute to an effective recycling program.

Subsection (j)
Subsection (j) specifies that each jurisdiction shall report the progress achieved in implementing its commercial recycling program, including education, outreach, monitoring, and, if applicable, enforcement efforts if the jurisdiction has implemented an enforcement program, by providing updates in its electronic annual report. This is necessary to ensure CalRecycle is provided information annually on jurisdictions' recycling programs without requiring jurisdictions to revise Source Reduction and Recycling Elements when implementing a new, or expanding an existing, commercial recycling program.

5. CalRecycle Review (section 95624)

Section 95624 specifies the oversight responsibilities of CalRecycle in ensuring a jurisdiction implements a commercial recycling program in accordance with this Article.

Subsection (a)
Subsection (a) specifies it is CalRecycle's responsibility to review a jurisdiction's compliance with its requirements under this Article to implement a commercial recycling program. Also, this subsection specifies the commencement date and mechanism for this review, which is important for providing lead time to affected jurisdictions. This is necessary to clarify the responsibilities of CalRecycle in reviewing a jurisdiction's compliance with its requirements under this Article to implement a commercial recycling program.

Subsection (b)
Subsection (b) specifies that CalRecycle may also review whether a jurisdiction is in compliance with its requirements under this Article to implement a commercial recycling program any time it receives information that a jurisdiction has not implemented, or is not making a good faith effort to implement its program. This is necessary to provide CalRecycle with an additional method for determining whether a jurisdiction is in compliance with its requirements under this Article to implement a commercial recycling program, other than through review of a jurisdiction's Source Reduction and Recycling Element and Household Hazardous Waste Element. Also, this is necessary to clarify that CalRecycle can act any time it determines that a jurisdiction is not meeting its requirements under section 95623.

Subsection (c)
Subsection (c) specifies that during its review of a jurisdiction's compliance with its requirements under this Article, CalRecycle is required to determine whether each jurisdiction has made a good faith effort to implement the program. This subsection clarifies the criteria a jurisdiction is required to meet in order for CalRecycle to determine whether a "good faith effort" has been made. This subsection defines "good faith effort" as "all reasonable and feasible efforts" by a jurisdiction to implement its selected commercial recycling program. This definition mirrors the "good faith effort" standard contained in PRC subsection 41825(e). CalRecycle has extensive experience in applying this standard in evaluating the programs contained in jurisdictions' Source Reduction and Recycling Elements. This "good faith effort" standard as provided in this Subsection takes into account the numerous considerations and factors contained in PRC subsection 41825(e)(1) through (5), as applicable to the jurisdiction. In addition, this subsection specifies a non-exclusive list of some specific factors pertaining to commercial recycling, that CalRecycle may include in its evaluation of a jurisdiction's "good faith effort." This subsection is necessary to ensure each jurisdiction is making a sufficient effort to implement a commercial recycling program and that its efforts are fairly evaluated.

Subsection (c) also specifies that a jurisdiction's failure to implement its commercial recycling program may be a sufficient basis for issuance of a compliance order, even if the jurisdiction has met its AB 939 50 percent per capita equivalent disposal target. This is necessary to ensure that in the event a jurisdiction fails to implement its

commercial recycling program, CalRecycle can issue a compliance order for achieving compliance. This is necessary to ensure each jurisdiction is meeting the requirements of this Article to implement a commercial recycling program.

Subsection (c)(1)
Subsection (c)(1) specifies that in its evaluation of a jurisdiction's "good faith effort," CalRecycle may include, but is not limited to, considering the extent to which the businesses are complying with subsection 95622(a), including information on the amount of disposal that is being diverted from the businesses, if available, and the number of businesses that are subscribing to service. This is necessary to clarify criteria that CalRecycle may use in determining whether a jurisdiction is making a "good faith effort" to implement a commercial recycling program that consists of outreach, education, and monitoring of businesses.

Subsection (c)(2)
Subsection (c)(2) specifies additional factors CalRecycle will consider in its evaluation of a jurisdiction's "good faith effort." These factors may include, but are not limited to, the extent to which material recovery facilities (including mixed waste processing facilities) utilized by the businesses exhibit recovery rates that, in combination with the entire set of programs and activities in a jurisdiction, are comparable to source separation, based on factors such as, but not limited to, the character and composition of the waste stream generated in the jurisdiction, the nature of collection systems in the jurisdiction, the role of that facility in the jurisdiction's overall waste diversion and recycling system, the nature and amount of feedstock processed at facilities used for waste generated in the jurisdiction, and any additional performance data, as requested and collected by CalRecycle from the material recovery facilities operators pursuant to 14 California Code of Regulations §18809.4.

Subsection (c)(3)
Subsection (c)(3) specifies that in its evaluation of a jurisdiction's "good faith effort," CalRecycle may include, but is not limited to, considering the extent to which the jurisdiction is conducting education and outreach to businesses in accordance with this Section. This is necessary to clarify criteria that CalRecycle may use in determining whether a jurisdiction is making a "good faith effort" to ensure each jurisdiction is making a sufficient effort to implement a commercial recycling program.

Subsection (c)(4)
Subsection (c)(4) specifies that in its evaluation of a jurisdiction's "good faith effort," CalRecycle may include, but is not limited to, considering the extent to which the jurisdiction is monitoring businesses and notifying those businesses that are out of compliance. This is necessary to clarify criteria that CalRecycle may use in determining whether a jurisdiction is making a "good faith effort" to implement a commercial recycling program.

Subsection (c)(5)
Subsection (c)(5) specifies that in its evaluation of a jurisdiction's "good faith effort," during its review, CalRecycle may include, but is not limited to, considering the availability of markets for collected recyclables. This is necessary to clarify criteria CalRecycle may use in determining whether a jurisdiction is making a "good faith effort" to implement a commercial recycling program.

Subsection (c)(6)
Subsection (c)(6) specifies that in its evaluation of a jurisdiction's "good faith effort," during its review, CalRecycle may include, but is not limited to, considering budgetary constraints of local jurisdictions. This is necessary to clarify criteria CalRecycle may use in determining whether a jurisdiction is making a "good faith effort" implement a commercial recycling program.

Subsection (c)(7)
Subsection (c)(7) specifies that in its evaluation of a jurisdiction's "good faith effort," during its review, CalRecycle may, include but is not limited to, considering a rural jurisdiction's small geographic size, low population density, or distance to markets in determining whether a rural jurisdiction is making a "good faith effort" to implement a commercial recycling program. This is necessary to clarify criteria that CalRecycle may use in determining whether a certain type of jurisdiction is making a "good faith effort" to implement a commercial recycling program.

Subsection (d)
Subsection (d) specifies that if, after a public hearing on the matter, CalRecycle finds that a jurisdiction has failed to make a good faith effort to implement a commercial recycling program, CalRecycle shall issue a compliance order with a specific schedule for achieving the requirements of this Article. This is necessary to ensure that a jurisdiction that is not complying with the requirements to implement a commercial recycling program is issued a compliance order with a specific schedule for achieving these requirements.

Subsection (e)
Subsection (e) specifies that the compliance order shall identify the portions of the commercial recycling program which are not being implemented or attained by the jurisdiction, or identify areas of the commercial recycling program which need revision.

Also, this subsection specifies that CalRecycle shall also set a date by which the jurisdiction shall meet the requirements of the compliance order. This is necessary to identify, for the jurisdiction, which aspects of its program are not being implemented or attained, and to set a date for the jurisdiction to comply with the requirements. This is necessary to ensure each jurisdiction is meeting the requirements of this Article to implement a commercial recycling program.

Subsection (f)
Subsection (f) specifies that CalRecycle shall hold a public hearing to determine whether the jurisdiction has complied with the terms of the compliance order in subsection 95624(d). If CalRecycle determines that the jurisdiction has failed to implement its compliance order and meet the requirements of section 95623, then CalRecycle shall take additional enforcement action, including imposition of penalties under CalRecycle's established AB 939 procedures contained in section 41850 of the Public Resources Code. CalRecycle shall, within 60 days document its determination that the jurisdiction was found to be out of compliance and was penalized, and forward that documentation to the ARB.

6. ARB Oversight (section 95625)

Section 95625 is necessary to explain ARB's role and function of responsibility and authority for oversight in implementation and, if necessary, enforcing the proposed regulation. AB 32 contains provisions in California HSC sections 38510 and 38530 that designate ARB as the state agency to monitor and regulate GHG emissions, and that require ARB to adopt regulations requiring reporting and verification of GHGs, the program for which ARB is to monitor and enforce (section 38580). Although CalRecycle will implement the regulations and investigate potential violations thereof, ARB retains the oversight authority to enforce and subject violators to penalties for non-compliance as stated in HSC sections. In the unlikely event that CalRecycle's enforcement efforts do not sufficiently achieve the goals of the program and ARB enforcement action is needed, then ARB may take steps as provided for in its existing statutes. A violation of the proposed requirements may result in civil and criminal penalties. The extent of the penalty would depend on the willfulness of the violation, the length of time of the noncompliance, the magnitude of the noncompliance, and other pertinent factors, consistent with the provisions outlined in HSC section 38580.

C. Necessity of the Proposed Regulation

Pursuant to Government Code sections 11349.1, and 11346.2(b)(1), and title 1, CCR, section 10, the following is a brief summary of each section in the regulation and describes the rationale for each proposed section.

Section 95620 Purpose
Section 95620 states the purpose of the regulation to give the background and framework of why the regulation is necessary and what it is designed to accomplish. The regulation is necessary to increase the diversion of commercial solid waste, which is expected to result in a reduction of 5 MMTCO2e and expand the opportunity for additional recycling services and recycling manufacturing facilities in California. This could provide increased feedstock for California recycling manufacturing facilities.

Section 95621 Definitions
Definitions of a number of technical and administrative terms from the Public Resources Code appear in this Article, but are not contained in Health and Safety Code. Therefore, definitions for the terms are provided to ensure regulatory consistency and clarity.

Section 95622 Mandatory recycling of commercial solid waste by businesses
This section specifies the responsibilities an affected business has to meet the requirements of this regulation. It specifies the actions a business may take to divert its commercial solid waste. This section also provides clarification on the following: businesses can utilize mixed waste processing facilities that yield comparable results to source separation, transformation is allowed per existing statute, the authority of the local jurisdiction, and the rights of businesses pursuant to existing statute.

Section 95623 Implementation of commercial recycling program by jurisdictions
This section specifies the requirements for local jurisdictions. Local jurisdictions must implement a commercial recycling program that consists of outreach, education, and identification and monitoring to affected businesses by July 1, 2012. The section also identifies the program components that are voluntary for jurisdictions to implement, such as enforcement, exemptions, and certification requirements for businesses that self-haul recyclables. Jurisdictions are required to report on their commercial recycling programs in the CalRecycle electronic annual report.

Section 95624 CalRecycle Review
CalRecycle is required to review each jurisdiction's compliance with the regulations as a part of its regular AB 939 review. CalRecycle is responsible for determining if each jurisdiction has made all reasonable and feasible efforts to implement its commercial recycling program. CalRecycle may look at a number of factors in determining compliance with the regulation, including the extent to which businesses have complied with the regulation, the recovery rate of material recovery facilities and mixed waste processing facilities that are utilized by the businesses, the extent that local jurisdictions have conducted outreach, education and monitoring of businesses to inform them of the state requirement to recycle, budgetary constraints, availability of markets, and barriers that rural jurisdictions may face, such as distance to markets, geography, and low population. CalRecycle may issue a compliance order if it determines at a public hearing that a jurisdiction is not in compliance with the regulation. After holding another public hearing and determining that the jurisdiction has failed to implement the compliance order within the specified time, CalRecycle may take additional enforcement action, including imposition of penalties under CalRecycle's established AB 939 procedures contained in §41850 of the Public Resources Code. CalRecycle shall, within 60 days document its determination that the jurisdiction was found to be out of compliance and was penalized, and forward that documentation to the Air Resources Board.

Section 95625 Air Resources Board Oversight and Enforcement
The section clarifies that the Air Resources Board retains its oversight role and will take any further actions necessary to implement this regulation, including but not limited to invoking its enforcement authority as described in §38580 of the Health & Safety Code.

D. ARB/CalRecycle Memorandum of Understanding

To clarify the tasks for implementing this proposed regulation, CalRecycle and ARB have entered into a Memorandum of Understanding (MOU) which outlines the roles of the two agencies (Appendix K). This MOU embodies the arrangement regarding CalRecycle's ability to implement and enforce the regulation and ARB's authority to monitor compliance with and enforce the regulation.

E. Regulatory Alternatives

California Government Code subsection 11346.2 requires ARB to consider and evaluate reasonable alternatives to the proposed regulation. Staff evaluated two key alternatives to the proposed regulation to implement mandatory commercial recycling. As presented to and recommended by CalRecycle, ARB has made a preliminary determination that no alternative considered would be more effective in carrying out the purpose for which the regulation is proposed or would be as effective as or less burdensome to affected private persons than the proposed regulation.

1. No Action

A 'no action" alternative would forego adoption of the proposed regulation and would leave the situation as it currently exists. Taking no action would avoid the GHG emissions benefits that would be achieved by the proposed regulation. It would also avoid any potential cost savings for businesses that recycle (discussed in greater detail in Chapter V). ARB is mandated to adopt standards to achieve the maximum technologically feasible and cost-effective reductions in GHG emissions. This alternative was rejected as it would result in failure to reduce GHG emissions from waste generated by businesses that is currently disposed in landfills.

2. Voluntary Commercial Recycling Measure

In developing the Commercial Recycling Regulation, staff discussed whether to propose a mandatory or voluntary approach. Staff initially proposed a voluntary approach, but subsequently a mandatory recycling approach was chosen because ARB and CalRecycle staff concluded that the volume of material needed to be recycled to meet the GHG reductions goal for commercial recycling could not be achieved by voluntary measures. Most stakeholder feedback from the workshops was not in support of a voluntary measure.

IV. EMISSIONS

A. Introduction

This chapter discusses the methodology used to estimate the GHG emission reductions from recycled products and compost material and presents the potential GHG emission benefits from the proposed regulation. Specifically, this chapter explains how the California-specific, life cycle-based, emission reduction factors for recycled materials were developed and used in calculating the GHG reductions for the proposed regulation. Also, presented in this chapter is a qualitative assessment of criteria pollutants (mostly nitrogen oxide (NOx) and particulate matter (PM)) and toxic air contaminant (TAC) reductions due to the proposed regulation.

B. Background

Commercial recycling and composting reduces GHG emissions by reducing the additional manufacturing activities that occur when relying on virgin materials. For example, using recycled aluminum requires less electricity than processing new aluminum oxide ore, thereby decreasing the amount of GHG emissions required to provide the energy to produce aluminum. Recycled paper reduces the quantity of trees that are harvested for the pulping process, which results in a GHG benefit from forest carbon sequestration. Compost provides benefits to the soil by reducing the need to use manufactured fertilizers or large quantities of water. A traditional GHG production-based methodology will not sufficiently quantify these cross-sector types of emission reductions. A life-cycle methodology is required.

Section C provides a detailed description of the life-cycle methodologies used to determine the emission reduction factors for recycling materials such as aluminum, plastic, glass, paper, and composting organic wastes such as food scraps and yard trimmings. Section D provides the potential emission reductions due to recycling of these materials. Details for the life-cycle methodologies are included in Appendices F and G.

C. Commercial Recycling Emission Reduction Factors

Separate approaches were used to develop a set of emission reduction factors for materials that are recycled and another for materials that are composted.

1. Recycling Emission Reduction Factors Methodology

The methodology used to develop emission reduction factors for recyclable materials takes into consideration GHG emissions from manufacturing processes, forest carbon sequestration, transportation, and the efficiency of the conversion of recycled material to remanufactured material (recycling efficiency).

The basic equation used to determine the Recycling Emission Reduction Factors (RERF) is as follows:

$$RERF = ((MS_{virgin} – MS_{recycled}) + FCS – T_{remanufacture}) * R_{use}$$

Where:

RERF	=	Recycling emission reduction factor ($MTCO_2e$/ton of material)
MS_{virgin}	=	Emissions associated with using 100% virgin inputs for manufacturing the material ($MTCO_2e$/ton of material)
$MS_{recycled}$	=	Emissions associated with using 100% recycled inputs for manufacturing the material ($MTCO_2e$/ton of material)
FCS	=	Forest carbon sequestration ($MTCO_2e$/ton of material)
$T_{remanufacture}$	=	Transportation emissions associated with remanufacture destination ($MTCO_2e$/ton of material)
R_{use}	=	Recycling efficiency (fraction of material remanufactured from ton of recycled material)

This equation applies to the recycling of aluminum, steel, glass, high-density polyethylene (HDPE), polyethylene terephthalate (PET), mixed plastics, corrugated cardboard, mixed paper, magazines/3rd class mail, newspaper, office paper, and phonebooks. This method is adapted from the U.S. EPA Waste Reduction Model (WARM), but includes California-specific data and a method to evaluate forest carbon sequestration. (U.S. EPA, 2006)

Individual RERFs for each material are shown in Table IV-1 and additional information on the methodology used to develop these factors can be found in Appendix F. The factor for dimensional lumber (construction wood waste) was obtained by estimating the avoided California grid average electricity generation that would be displaced by combusting dimensional lumber. The difference in approach between dimensional lumber and the other recyclable materials is due to the fact that most recycled dimensional lumber is used for combustion, not reprocessed into more lumber. No GHG emission reductions are expected from recycled concrete.

Table IV-1. Recycling Emission Reduction Factors for Each Material

Material	Recycling Emission Reduction Factors (RERFs) ($MTCO_2e$ /ton)
Aluminum	12.9
Steel	1.5
Glass	0.2
HDPE	0.8
PET	1.4
Mixed Plastics[a]	1.2
Corrugated cardboard	5.0
Magazines/3rd class mail	0.3
Newspaper	3.4
Office paper	4.3
Telephone books	2.7
Mixed paper[b]	4.3
Dimensional lumber	0.21
Concrete	0.0

[a] The mixed plastics average assumes a mix of 71% PET and 29% HDPE.

[b] The mixed paper average assumes a mix of 28 % corrugated cardboard, 30% composite paper, 17% miscellaneous paper, 7% newspaper, 7% other office paper, 4% white ledger paper, 4% magazines and catalogs, 2% paper bags and 1% phonebooks (CIWMB, 2009).

RERFs for some recyclable materials for which U.S. EPA has provided an emission reduction factor are not included in the above table. Staff only included RERFs for which we found sufficient technical data and California-specific economic information. Additionally, staff considered the amount of material currently recycled in California. Recycling factors for materials that are not substantially recycled in California were not included. In the future, as more information becomes available, the above factors may need to be updated and new factors added. However, the vast majority of materials (estimated to be over 95 percent) that are currently recycled in California are represented by the above RERFs. The priority for developing additional RERFs will be based on whether the material is likely to be recycled in significant quantities in California.

2. Composting Emission Reduction Factor Methodology

Although not included in the calculation of emissions benefits for Scenario 2.1 (S2.1) and Scenario 2.2 (S2.2), the Composting Emission Reduction Factors (CERF) were developed to evaluate the additional composting that may occur as a result of this regulation due to the multiple material types available for commercial recycling. The methodology for developing emission reduction factors of compostable materials (food scraps, yard trimmings, grass, leaves, branches, and organic municipal solid waste) focuses on the GHG emission reduction benefits from applying composted material to unamended soil. This methodology builds upon the U.S. EPA's WARM for its CERF. (U.S. EPA, 2006) Specifically, the staff has included variables (using California-specific data) for reduced soil erosion, increased water retention, reduced synthetic fertilizer use, and reduced herbicide use that are not included in WARM. Ongoing research and

other studies to improve life-cycle estimates of GHG emissions will be followed closely by staff.

The basic equation used to determine the CERF is as follows:

$$CERF = (CS_b + ((W_b + E_b + F_b + H_b) * C_{use})) - E_{total}$$

Where:

CERF = Composting emission reduction factor ($MTCO_2e$/ton of feedstock)
CS_b = Emission reductions associated with the increased carbon storage in soil ($MTCO_2e$/ton of feedstock)
W_b = Emission reductions due to decreased water use ($MTCO_2e$/ton of compost)
E_b = Emission reduction associated with decreased soil erosion ($MTCO_2e$/ton of compost)
F_b = Factor to account for the reduced fertilizer use ($MTCO_2e$/ton of compost)
H_b = Factor to account for the reduced herbicide/pesticide use ($MTCO_2e$/ton of compost)
C_{use} = Correction factor used to convert from tons of compost to tons of feedstock
E_{total} = Emissions due to the composting process ($MTCO_2e$/ton of feedstock)

The CERF generated from this method is shown in Table IV-2. Additional information on the sources of data and assumptions is provided in Appendix G. The CERF does not account for the life-cycle GHG impact from landfill diversion. Staff found that there is not sufficient data to reliably determine the impact of several factors including reduction in carbon storage and electricity generation at landfills. However, the potential methane and VOC reductions from the redirection of compostable materials are discussed in section D.3.

Table IV-2. Composting Emission Reduction Factor of Compostable Material

Material	Composting Emission Reduction Factor (CERF) ($MTCO_2e$/ton)
Compost (food scraps, yard trimmings, grass, leaves, branches and organic municipal solid waste)	0.42

A large GHG benefit from applying compost to soil is due to increased soil carbon storage. Soil carbon storage from compost is markedly different from the carbon stored in landfills. When an organic material that contains carbon is placed in a landfill, the carbon is essentially inert, meaning that it will degrade slowly (if at all) over time without noticeable beneficial uses. In contrast, the carbon in compost that is applied to soil has multiple beneficial uses in addition to slow degradation rates. This is due to humic

substances, which form when organic materials, such as grass or branches, are composted. Humic substances are large macromolecular organic compounds that tend to increase soil tilth, aeration, water retention, and can take hundreds or thousands of years to degrade. (Barker AV, 1997; Sutton R and Sposito G, 2005)

D. Potential Emission Reductions

The GHG emission reduction factors generated from the RERFs methodology were used to determine the overall potential emission reductions associated with commercial recycling. Staff used S2.1 and S2.2 to estimate emissions. These scenarios focus on traditional recyclables and assume that there would be a higher recovery rate of high value recyclables (aluminum/metals, plastic, and cardboard) and a greater percentage of material would be moved by self haul compared to what was assumed in Scenario 2 (S2). Chapter V has a detailed description of each of these scenarios.

The sections below describe the anticipated GHG, criteria pollutant, and TAC emission reductions associated with the proposed regulation. It also describes the avoided landfill gas emissions and potential increased transportation emissions due to the proposed regulation.

1. GHG Emissions

According to the 2008 CalRecycle waste characterization study, about 28 million tons of commercial solid waste is disposed of in California's landfills each year. (CIWMB, 2009) It is anticipated that about 1.7 million tons of additional recycling will occur due to this regulation, which will lead to a 5 $MMTCO_2e$ reduction in GHG emissions. Under the proposed regulation, it is not possible to predict with certainty the commercial solid waste streams that will be recycled to meet the 5 $MMTCO_2e$ reduction goal. The materials in the solid waste vary in their emission reduction potential. The mix of the material in the solid waste is a major factor in the amount of solid waste that needs to be recycled to meet the emission reduction goal. GHG reductions are dependent on the tonnage and material mix (also known as profile) and cannot be precisely predicted; however, the most likely profiles (from S2.1 and S2.2) are used to estimate emissions reductions. Chapter V contains a detailed discussion of why S2.1 and S2.2 are the most likely profiles.

Table IV-3 shows the anticipated statewide GHG emission reduction for S2.1 and S2.2. These scenarios assume that 5 $MMTCO_2e$ of GHG reductions will occur by commercial recycling programs focusing on traditional recyclables (metals, paper, plastic, and glass) and construction/demolition wood waste. In Table IV-3, the assumed tons of recycled material for S2.1 and S2.2 were multiplied by its corresponding RERFs to determine the GHG emission reductions. Table IV-3 shows the amount of material recycled.

Table IV-3. Statewide Estimated GHG Emission Reductions for Scenarios 2.1 and 2.2*

	Tons of material recycled (tons)	GHG reduction ($MTCO_2e$)
Aluminum	61,248	790,099
Steel	552,656	828,984
Glass	24,860	4,972
HDPE	84,767	67,814
PET	63,838	59,373
Corrugated Cardboard	542,160	2,710,800
Office Paper	72,566	312,034
Newspaper	37,192	126,453
Magazines/3rd Class Mail	20,132	6,040
Phonebooks	2,267	6,121
Dimensional Lumber	278,533	58,492
Compostable Paper	---	---
Food	---	---
Yard Waste	---	---
TOTAL	**1,740,218**	**5,001,181**

*Assumes a variety of commercial recycling programs that process traditional recyclables and construction/demolition wastes. Scenario 2.1 and 2.2 assume the same recovery rate of high value recyclables.

As discussed earlier, most of the emission reductions will occur at the point of remanufacture and not at the origin of recycling. While some materials recycled in California remain in California for remanufacturing, the majority of the recycled materials are shipped to other parts of the United States or globally. For example, the majority of aluminum cans recycled in California are remanufactured into new material in the Southeastern United States. There will be some GHG emission reductions at landfills due to the reduction of decomposable materials (for S2.1 and S2.2, mainly cardboard and office paper); however, for this analysis we have focused on upstream GHG reduction due to use of recyclable materials. As a result, and assuming that the current recycling infrastructure remains constant, staff estimates that about 5 percent of the 5 $MMTCO_2e$ of GHG reductions anticipated from S2.1 and S2.2 will occur within California. Any increase in composting would also increase the potential GHG reductions within California.

2. Criteria Pollutant and TAC Emissions

Given that the locations where recyclable materials are reprocessed are generally outside California, it is not possible to quantitatively determine the criteria pollutant and TAC reductions that will occur due to the proposed regulation. However, a qualitative assessment is possible using emission factors developed by U.S. EPA that compares emissions from raw material-based processes versus recycled material-based processes for the same product. Staff found that using recycled material would result in an overall reduction in carbon monoxide (CO), NO_x, sulfur oxides (SO_x), PM, and VOCs, as well as reductions in TACs, including lead (Pb) and toxic VOC compounds at the point of reuse. (U.S. EPA, 2003) The only exception to this finding was that office paper may increase VOC emissions due to the deinking process.

3. Avoided Landfill Gas Emissions

An increase in the amount of recycling will lead to a decrease in the amount of solid waste placed into a landfill. The amount of reduced material placed into a landfill may lead to a reduction in landfill methane and VOC emissions. For S2.1 and S2.2, the recyclable materials responsible for the methane and VOC emission reductions are office paper, corrugated cardboard, dimensional lumber, newspaper and magazines.

Avoided methane emissions were determined by calculating the total emissions from the decomposition of a ton of organic material. (IPCC, 2006) It is assumed the methane collection efficiency at landfills (on a statewide basis) is or soon will be about 85 percent. The remaining 10 percent of the methane is oxidized in the landfill cap. Applying this method to the S2.1 and S2.2 tonnages leads to a potential reduction in landfill emissions of about 14,900 tons of methane per year. As discussed below, the avoided landfill methane emissions are considered an upper bound for overall landfill emissions. In reality, due to other life-cycle landfill variables (e.g. displaced electricity from fossil fuels via landfill gas and landfill carbon storage) the avoided methane emissions may be smaller depending on the material, its physical and chemical properties, and what is done with the methane collected at a landfill.

Inclusion of landfills into the CERF methodology would require a life-cycle approach. Life-cycle landfill variables include avoided landfill methane, transportation emissions from solid waste collection, landfill carbon storage and displaced electricity from fossil fuels through the use of landfill gas. The variables listed above are consistent with the variables identified in the WARM developed by U.S. EPA. However, staff believes there are sufficient uncertainties among these variables that make it inappropriate to adjust the CERF without a more in-depth analysis of all four of these variables. Staff does not believe making a correction to the CERF for only avoided landfill methane emissions is appropriate or necessary at this time because: the CERF is important, but not critical to implementing the proposed regulation; the regulation will not be fully implemented until 2020 so there is time for further study; the most likely approach to compliance does not rely on composting; and ARB and CalRecycle staff are beginning a joint effort to look at composting and anaerobic digesting as an area for additional GHG reductions. As more California-specific data become available in the future, adjustments to the RERF/CERF may be made.

Avoided VOC emissions were calculated by determining the landfill organic speciation profile for methane and VOC and applying them to the avoided methane total (ARB, 2010). The results indicate that about 100 tons per year of VOC will be reduced due to this regulation assuming a recycling profile similar to S2.1 and S2.2.

4. Transportation Emissions

Emissions from waste and recycling collection vehicles will continue to decline in future years due to the implementation of ARB regulations. However, increases in vehicle miles traveled (VMT) associated with additional recycling are projected to result in a

reduction in the benefits of these regulations. Because of the considerable uncertainties in predicting how the affected industry will respond, it is difficult to predict how implementation will impact VMT. There could be an increase, decrease, or possibly no change in the VMT. In the event that there is an increase in VMT associated with additional recycling, an increase in emissions of criteria pollutants (mainly NO_x) and diesel PM which is a TAC may result. The potential increases in VMT based on S2 was calculated to be 40,000 miles per day at full implementation. (See Appendix H for more details.)

Based on the VMT calculated for S2, the corresponding potential increases in emissions were calculated to be 0.8 tons/day of NO_x, 0.003 tons/day (6 pounds/day) of $PM_{2.5}$, and 150 tons/day of CO_2 at full implementation in 2020. These emission estimates are upper limit estimates for S2.1 and S2.2 for several reasons. For example, it is anticipated that the jurisdiction's outreach and education programs will lead to reduced packaging and more reuse which would decrease VMT. Also, transportation emissions are lower for S2.1 and S2.2 because of the anticipated increases in self haul and therefore a decrease in diesel truck use or more efficient use due to less stop and go pattern when compared to S2.

5. Emission Reductions from C&D Wood Waste Burning

Recycled dimensional lumber (construction wood waste) is used for combustion in the RERF method and accounts for a large amount of the total tonnages from Scenarios 2.1 and 2.2. When dimensional lumber is burned, it has a higher heat content than virgin wood (for purposes of this discussion virgin wood is defined as similar to green waste; Jambeck et al, 2007). Assuming the increased recycling of dimensional lumber displaces the burning of green waste at biomass facilities, the overall emissions (both criteria pollutants and GHG) from the facility may be reduced. One existing study indicates that the particulate matter and NOx emissions from green waste and C&D lumber are similar (NESCAUM, 2006). However, another study indicates that C&D wood waste may have lower particulate matter and NOx emissions than green waste (Jambeck et al., 2007). Based on the data presented from these studies, the recycling of dimensional lumber may have the potential to reduce particulate matter and NOx emissions at biomass facilities.

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V. ECONOMIC IMPACTS OF THE REGULATION

A. Summary

In January 2009, CalRecycle entered into a contract with Hilton Farnkopf & Hobson (HF&H), to estimate the costs, cost savings, and net costs to collect, haul, process, and market varying amounts of targeted recyclable materials with high lifecycle GHG impacts. The cost assessment provides information on costs and cost-effectiveness of the proposed regulation by evaluating various types of recycling programs that could be implemented based on four different recycling scenarios, named: Scenario 1, 2, 3 and 4. (See Appendix I for a discussion of the Scenarios.) Each of these scenarios is based on a set recycling pattern and collection rate. The economic analysis focused on the impacts of the proposed regulation on affected businesses and multifamily complexes (hereafter referred to as affected businesses) that would be required to institute commercial recycling. The results from HF&H's cost assessment are discussed in detail in the HF&H report. (HF&H, 2011a) The HF&H report is available at http://www.calrecycle.ca.gov/Publications/default.asp?pubid=1372, and is attached to this Intial Statement of Reasons (ISOR) as a reference.

ARB and CalRecycle staff (staff or we) evaluated the results of HF&H's cost assessment and preliminarily selected Scenario 2 (S2) as the most likely scenario for the proposed regulation. The second scenario, S2, targeted traditional recyclables and construction and demolition (C&D) to achieve the 5 MMTCO2e emissions reduction goal. S2 has the lowest compliance costs of the four scenarios and relies on the existing infrastructure which currently has excess capacity. At the January 2010 workshop, staff presented the estimated costs of the proposed regulation based on S2 cost estimates.

During and after the January 2010 workshop, staff received considerable comments that the S2 cost estimates were overestimating the costs of the proposed regulation. HF&H, CalRecycle, and ARB re-evaluated several of the key underlying economic assumptions. Staff concluded that two of the economic assumptions could be adjusted to better reflect how businesses could comply with the proposed regulation at lower costs than estimated under S2.[1] Staff assumed that there would be a higher recovery rate of high value recyclables (aluminum/metals, plastic, and cardboard) and a greater percentage of material would be moved by self haul compared to what was assumed in S2. Under S2, a constant recovery rate (40 percent) was used for all recyclables regardless of the revenue potential of the material. S2 also assumed that a low

[1] Two additional economic assumptions that were considered were increase in future landfill disposal costs and cost savings due to waste reduction programs. Staff determined we were not able to adjust the model to reflect an increase in disposal costs as there are conflicting indicators with respect to specific regulatory requirements (LF CH4 Capture Reg & Financial Assurance) as well as the uncertainty of the marketplace for disposal in recent years that made this assumption too difficult to estimate. Staff also reviewed available data relative to waste reduction or zero waste programs and determined that the increase in education and outreach to businesses resulting from the regulation was likely to increase the number of businesses implementing zero waste strategies and realizing associated cost savings. However, based on the available data, staff was not able to determine the cost savings from implementing zero waste programs on a statewide basis.

percentage of material (2 to 3 percent increase in total tonnages) was to be moved by self-haul.

As a result, staff further analyzed two lower cost compliance approaches to estimate the systemwide cost impacts due to the proposed regulation. These compliance paths are referred to as Scenario 2.1 (S2.1) and Scenario 2.2 (S2.2). These scenarios assume higher recovery rates for the high value commodities (aluminum/metals, plastics, cardboard) coupled with a low to modest increase in self-hauling these high value recyclables. Under these scenarios, about 1.7 million tons of commercial solid waste would need to be recycled to achieve 5 MMTCO_2e reduction.

In addition, CalRecycle and ARB staff analyzed the economic impact of the proposed regulation on local jurisdictions, State agencies (including colleges and universities, ARB, and CalRecycle), federal agencies, and school districts (hereafter also referred to as governmental entities).

The economic analysis presented herein estimated the economic impacts of the proposed regulation on affected commercial businesses and multifamily complexes (hereafter also referred to as affected businesses) that would be required to institute commercial recycling. The findings assume that the most likely cost impact from the proposed regulation are best represented as a range in costs bracketed by the cost estimates identified in S2.1 and S2.2. Below are the key findings of the economic analyses. All costs are in 2010 dollars unless otherwise noted.

Summary of Key Findings:

- About 320,000 businesses (250,000 commercial businesses and 70,000 multifamily complexes with 5 or more dwelling units) are likely to experience savings during the initial years of the regulation but may incur modest costs at full implementation to comply with the proposed regulation. In addition, it is anticipated that about 500 local jurisdictions will incur relatively low costs implementing the education, outreach, and monitoring requirements of the proposed regulation.

- Implementation of the proposed regulation from 2012 through 2020 will result in a net systemwide savings of between $343 million to $519 million (Net Present Value (NPV)[2]: $320 million to $458 million) compared to the projected systemwide costs without the proposed regulation. Between $408 million to $585 million (NPV: $370 to $508 million) of the savings would be realized by affected businesses including multifamily complexes due to compliance with the proposed regulation. In addition, a cost of $65 million (NPV: $50 million) would be incurred by local jurisdictions to implement the proposed regulation;

[2] Net Present Value is the difference between the present value of the future cash flows from an investment and the amount of investment. Present value of the expected cash flows is computed by discounting them 5% discount rate.For definition of net present value see: http://en.wikipedia.org/wiki/Net_present_value

staff assumed this cost would be passed on to affected businesses as indirect costs. Throughout this analysis, the net present value is calculated using a 5% discount rate.

- Over the 2012 through 2020 time period, the average annual savings to a typical business would be between $119 and $180 per year, which is about $10 to $15 (equivalent annual cost: $12 to $17) per month. For an average household living in a multifamily complex over the same period, it is estimated that there would be an average savings of between $5 and $7 per year, or about a savings of between $0.4 to $0.6 per month.

- The cost estimates are based on reasonable expectations of how businesses will implement the proposed regulation as reflected in S2.1 and S2.2. Several additional factors may contribute to even lower cost estimates including: waste reduction through increased business efficiencies, greater reuse of materials, less solid waste through more efficient packaging and other waste reduction strategies, and lower recycling costs through economies of scale. While staff agrees that these factors might further mitigate estimated costs, due to data limitations, staff was not able to estimate the economic impact of these additional factors over the next 10 years.

- Due to existing regulatory and voluntary actions, no additional, or relatively low additional, costs are expected for local jurisdictions, State agencies (including colleges and universities, federal agencies, and school districts to comply with the recycling requirements in the proposed regulation.

- Implementation of the proposed regulation will be gradual, beginning in July of 2012 with full implementation in 2020. Systemwide costs in the beginning years of the program will result in a cost saving for the first seven to eight years; costs will gradually increase over time until full implementation is attained in 2020.

- In 2020, the estimated costs for an average business would increase by between $8 to $14 per month. Similarly, for an average household living in a multifamily complex covered by the proposed regulation, the estimated costs would increase by between $0.3 and $0.6 per month.

- The average cost-effectiveness of the proposed regulation from the 2012 through 2020 time period would be a savings of $14 to $21 (equivalent annual cost: $13 to $18) per metric ton of CO_2e reduced.

B. Legal Requirements

Section 11346.3 of the Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulation. The assessment shall include a consideration of the impact of the proposed regulation on

California's jobs, business expansion, elimination or creation, and the ability of California businesses to compete with businesses in other states.

Also, State agencies are required to estimate the cost or savings to any State or local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate shall include any non-discretionary cost or savings to local agencies and the cost or savings in federal funding to the State.

C. Compliance Costs to Affected Businesses

This section discusses the methodology and results of the analysis of statewide compliance costs to affected businesses including multifamily complexes. It is separated into two subsections; the first discussing the methodology and the second discussing the results.

1. Methodology – Compliance Cost to Affected Businesses

a. Background

Under contract to CalRecyle, HF&H analyzed data and developed methodologies to estimate the costs to recover and recycle material from the commercial solid waste stream. HF&H developed a cost model with which statewide costs or savings due to additional commercial recycling can be assessed. This model and the supporting documentation are contained in HF&H's report published in January, 2011. The HF&H report is available at: http://www.calrecycle.ca.gov/Publications/default.asp?pubid=1372 HF&H's results were presented to stakeholders at workshops during the informal rulemaking period to seek stakeholder feedback.

After considering stakeholder comments that the cost projections were overestimating costs of the proposed regulation, HF&H, CalRecycle, and ARB re-evaluated several of the key underlying economic assumptions used in the model. Under S2, a single recovery rate for traditional recyclables (40 percent) was used regardless of the revenue potential of the material. Further, a relatively low amount of the high valuable recyclable material was assumed to be moved by self-haul.

Staff concluded that two of the assumptions in the cost model could be adjusted to better reflect how businesses are likely to comply with the proposed regulation at lower costs than estimated under Scenario 2. These two adjustments were (1) a higher recovery rate of high value recyclables (aluminum/metals, plastic, and cardboard) and (2) a greater percentage of the high value recyclables would be moved by self haul compared to what was assumed in the HF&H report for S2. Two additional economic assumptions that were considered were an increase in future landfill disposal costs and cost savings due to solid waste reduction programs. Staff determined that the model could be adjusted to reflect these assumptions due to lack of data on a statewide basis.

Two new scenarios (Scenarios 2.1 and 2.2, or S2.1 and S2.2) were developed using modified assumptions for the recovery rate for high value recyclables and the amount of the material moved by self-haul. The cost estimates developed using S2.1 and S2.2 will serve as staff's "best estimate" of the range of costs resulting from implementing the proposed regulation. S2.1 cost estimates assume recycling of traditional recyclables and construction & demolition (C&D) material with a higher recovery rate for high value recyclables and a low level of self-haul. S2.2 cost estimates uses the same assumptions as in S2.1 except a greater amount of self-haul is assumed. A comparison of the assumptions for S2, S2.1 and S2.2 is shown in Table V-1.

Table V-1. Comparison of Assumptions for Scenarios 2, 2.1 and 2.2

Scenario	Assumptions for Cost Estimates
S2 (Scenario 2)	Traditional recyclables and C&D, 40% recovery rates, and original self-haul percentage (Table V-6)
S2.1 (Scenario 2.1)	Traditional recyclables and C&D, higher recovery rates for high value recyclables (Table V-5), and low level of self-haul (Table V-6)
S2.2 (Scenario 2.2)	Traditional recyclables and C&D, higher recovery rates for high value recyclables (Table V-5), and moderate level of self-haul (Table V-6)

The regulatory cost estimates for S2.1 and S2.2, based on reasonable assumptions for how businesses will comply with the proposed regulation, are deemed "best estimates" when compared to other possible compliance approaches such as those considered in the HF&H report because of their low compliance costs. Results of these cost estimates were used to estimate the cost range that affected businesses will incur to comply with the proposed regulation. The following discussion provides the basic data, data references, and methodology of how the compliance costs were calculated.

b. Methodology for Estimating Costs

The cost estimates use California specific data to account for all costs incurred in collecting, transporting, and processing a sufficient amount of commercial solid waste to meet a goal of reducing GHG emissions by 5 $MMTCO_2e$. The costs are then offset by the value of the recycled materials sold as commodities and reduced landfill disposal costs. The Staff Report focuses on providing a description of the methods specific to S2.1 and S2.2, which includes traditional recyclables and C&D wood waste and reasonable assumptions for recovery rate and amount of back-haul/self-haul. Staff believes S2.1 and S2.2 to be the most likely and least costly compliance approach.

The compliance cost is defined as the incremental economic resources needed to comply with the regulation compared to collection, transportation, processing, and disposal costs without the regulation. The cost reflects only the additional resources needed to meet the proposed regulatory requirements.

Under the proposed regulation, it is not possible to predict with certainty the commercial solid waste streams that will actually be recycled to meet the 5 $MMTCO_2e$ reduction goal. The materials in the solid waste vary in their emission reduction potential; thus,

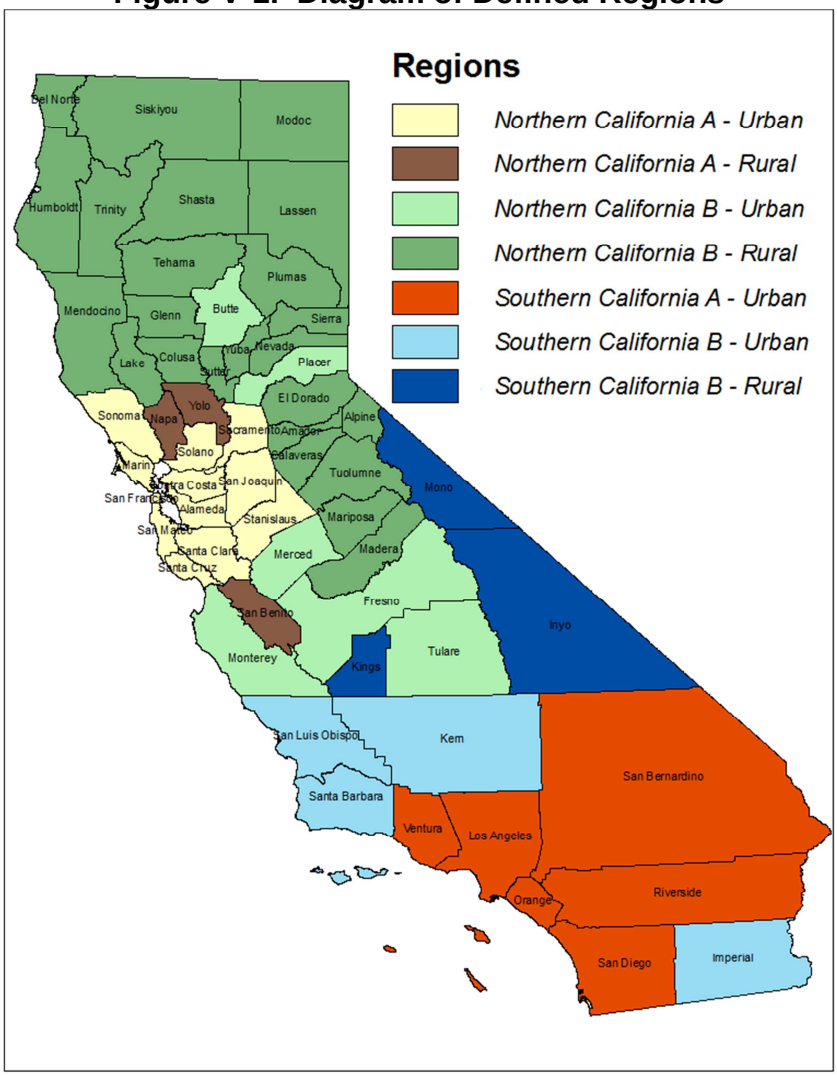
the mix of the material in the solid waste is a major factor in the amount of recycled material needed to meet the emission reduction goal. Since the GHG reductions are dependent on the tonnage and material mix (also referred to as the “waste profile”), four scenarios were originally developed and discussed in the HF&H report. After the release of the final HF&H report, HF&H, CalRecyle, and ARB staff developed S2.1 and S2.2, which build upon the original S2 analysis. As discussed above, these two scenarios assume greater recovery for certain high value recyclables and increased levels of self-haul (low for S2.1 and moderate for S2.2) compared to S2.

Since costs can vary significantly by geographic regions, the cost model disaggregates the State into seven regions based on distances to major ports. The statewide cost for each scenario is an aggregate of the cost for the seven regions. The regions are as follows (also shown on page 17 of HF&H report):

Region 1 - Northern California - A - Urban,
Region 2 - Northern California - A - Rural,
Region 3 - Northern California - B - Urban,
Region 4 - Northern California - B - Rural,
Region 5 - Southern California - A - Urban,
Region 6 - Southern California - B - Urban, and
Region 7 - Southern California - B - Rural.

The location and boundaries of these seven regions are shown on Figure V-1.

Figure V-1. Diagram of Defined Regions



c. Tonnage Determination

Californians discarded about 36 million tons of solid waste materials in 2008. Of this solid waste, about 28 million tons, or 75 percent, originates from the commercial sector. This commercial solid waste contains a variety of materials. Table V-1 shows the tons of commercial solid waste available for 19 material types by region. The data source for the commercial disposed solid waste stream is CalRecycle's Disposal Reporting System (DRS). (CalRecycle, 2011). The waste characterization or composition profiles were developed from data contained in several waste characterization studies. (CalRecycle, 1999 and 2006, City of Los Angeles, 2002). For analytical purposes, the disposed solid waste stream is categorized into four subsectors based on material type and whether the material is commercial hauled or self-hauled. The four subsectors are:

- Commercial solid waste, other than construction or demolition activities, collected by commercial haulers;

- Commercial solid waste, other than construction or demolition activities, that is self-hauled;
- Commercial solid waste from C&D activities collected by commercial haulers; and
- Commercial solid waste from C&D activities that is self-hauled.

The general approach for estimating the tonnage of recyclable material available for recovery involves the following steps:

1. Estimate the quantity of solid waste associated with each solid waste subsector in each region of the State;
2. Overlay on that quantity of solid waste an estimated composition profile for the identified material; and
3. Calculate the quantity of each material anticipated to be disposed of in each region for each solid waste subsector.

Table V-2 shows the statewide estimated amount of material (by material type) available for recovery in the commercial solid waste stream in 2008. The values in this table represent the sum of the regional contributions as shown in Table 4-2 in the HF&H report. The available tons changes slightly during the forecast period because they are adjusted for annual percentage changes in employment rate and change in the number of housing permits issued annually based on LAO's economic forecast.

Table V-2. Tons of Commercial Solid Waste Available by Material Type (2008)

Material Type	Amount (tons)
HDPE	131,400
PET	97,800
Other plastics	1,475,400
Aluminum cans and nonferrous metals	75,000
Steel cans and ferrous metals	851,500
Glass containers	240,300
Cardboard and paper bags	1,316,800
Magazines and catalogs	146,200
Newsprint	256,800
Office paper	529,600
Phone books	15,500
Compostable paper	1,611,100
Dimensional lumber	1,690,800
Food	3,246,200
Yard waste	1,493,700
Carpet	661,700
Concrete	519,500
Tires	35,900
All other materials	13,187,200
Totals	**27,582,600**

Source: This Table is taken from the HF&H report but values have been rounded (Table 4-2 of the HF&H report).

To meet the 5 $MMTCO_2e$ GHG goal, only a portion of the available recoverable material shown in Table V-1 needs to be recovered and recycled. To determine how much GHG reductions would be available by recycling a specific type of material, ARB staff developed California specific GHG emission reduction factors. These factors allow the

estimation of the metric tons of GHG emission reductions that would occur if a ton of the material was recycled instead of being landfilled. The Recycling Emission Reduction Factors (RERFs) and Composting Emission Reduction Factor (CERF) are shown in Chapter IV, Tables IV-1 and IV-2. Detailed information on the derivation of these factors can be found in Chapter IV and in Appendices F and G. The relevant RERFs for the material types specific to S2.1 and S2.2 are shown in Table V-3.

Table V-3. Recycling Emission Reduction Factors and Emissions Reduction Potential for Scenarios 2.1 and 2.2

Material Type	RERF ($MTCO_2e$/Ton)	Available Tons in 2020 (Tons)	Emissions Reduction Potential (RERF X Available Tons) ($MTCO_2e$)
HDPE	0.80	132,400	106,000
PET	1.40	99,700	139,600
Aluminum cans and nonferrous metals	12.90	76,600	987,600
Steel cans and ferrous metals	1.50	863,500	1,295,300
Glass containers	0.20	248,600	49,700
Cardboard and paper bags	5.00	1,355,400	6,777,000
Magazines and catalogs	0.30	143,800	43,100
Newsprint	3.40	265,700	903,200
Office paper	4.30	518,300	2,228,800
Phone books	2.70	16,200	43,700
Dimensional lumber	0.21	647,800	136,000
Total Available Tons/ Total Achievable GHG Reduction		4,368,000	12,710,200

Source: Values in this table is taken from Appendix I and have been rounded.

As shown in Table V-3, the RERFs (by material type) are multiplied by the available tons of recoverable material in 2020 (also shown in Table IV-3 of Chapter IV) to estimate the total GHG emission reductions potentially available by material type. The metric tons of emissions reductions potentially available, by material type, are summed to estimate the total tons of GHG emission reductions available. As shown in the last row of Table V-3, a potential of 12,710,200 $MTCO_2e$ or 12.7 $MMTCO_2e$ is available from the targeted solid waste streams.

To assess the material-specific recovery rates of the materials, especially those with high resale value, staff searched the published literature and found that numerous studies have investigated the recovery rate for recyclable commodities, but also found that there is no consensus on typical recovery rates for various materials. Further, existing information is not specific to commercial recycling and does not necessarily track with the actions that affected businesses will take in response to a mandate to recycle. Therefore, staff made assumptions as to how business could comply with the regulation at a lower cost than assumed under S2. A higher recovery rate of high value recyclables would generate greater revenue from the resale of the material. Under S2, staff assume the same recovery rate (40%) for all traditional recyclables. In consideration of the recovery rate for high value recyclables under the statewide residential recycling program, and with information obtained from a phone survey of business in jurisdictions with mandatory commercial recycling programs, staff have revised this assumption in S2.1 and S2.2.

Existing data that supports a higher recovery rate for the high value recyclables are summarized here. CalRecycle's Beverage Container Program reported an overall

recycling rate for calendar year 2010 of 82 percent. In particular, the recycling rate for aluminum was 94%, glass 85%, PET 68%, and HTPE 92%. Recycling rates for cardboards should also be higher than 40%; according to the American Forest and Paper Association, the recovery rate of old corrugated containers (OCC), which is driven by both domestic and export demand, resulted in a recovery rate for OCC of 85 percent in 2010, up from 82 percent in 2009. Although the recovery rates for commercial recycling are not expected to be as high as in the residential sector due to many factors including the maturity of the recycling program, these set of data does support that a recovery rate greater than 40% is a reasonable assumption for high value recyclables.

ARB staff conducted a phone survey in May – June 2011 to gather information on how commercial businesses have responded to mandatory commercial recycling requirement in 10 out of 46 jurisdictions that currently have commercial recycling programs. These jurisdictions were chosen to represent a cross section of California's commercial recycling programs based on their geographic locations and population. The survey attempted to gather additional information in four areas: the level of participation in recycling, impacts of recycling on business costs, materials targeted for recycling, and the relative amount of self-haul activity. Staff made more than 700 contacts and obtained usable information from about 200 businesses. Staff acknowledges that the results of this survey were not gathered in a manner to allow for rigorous statistical treatment of the data. (See Appendix J for a more detailed discussion of ARB's phone survey.) However, the information gathered supports the assumption that increased recovery of high value recyclables is likely to occur under a statewide commercial recycling program. Table V-4 shows a summary of the phone survey results.

As shown in Table V-4, the survey results found that there is a high level of participation in (about 86% of the businesses) recycling within the jurisdictions that have a commercial recycling program or ordinance in place. Most of the operators of the impacted businesses (about 82%) felt that recycling has saved the business money. The high value recyclables are recycled by a majority of the businesses at a rate of 55 to 79 percent.

Table V-4. ARB's Phone Survey Results

Four Areas Covered	Phone Survey Responses
Level of Participation in Recycling (% Recycling)	86% had a recycling program
Impact on Business Costs	82% said that they were saving money with their recycling program
Targeted Materials	55% to 79% said they were targeting at least one of the high value recyclables: metal, plastics, and cardboard
Self-Haul Activity	30% said use recycling services that are performed by parties other than the local government or franchise waste hauler

A summary of the recovery rates, their associated tonnages in 2020, and their expected emissions reduction are shown in Table V-5. The available tons for each material type, multiplied by the material recovery rate, and multiplied by the RERF, gives the expected emissions reduction shown in the last column, 'Expected Emissions Reduction', of Table V-5. As shown on Table V-5, it is expected that to achieve the 5 $MMTCO_2e$ reduction, there will be an increase of about 1,740,200 tons in recycled material out of the 27,882,500 tons managed in 2020.

Table V-5. Summary of Recovery Rates and Expected Emissions Reduction for Scenarios 2.1 and 2.2

Material Type	RERF ($MTCO_2e$/Ton)	Available Tons In 2020 (Tons)	Material Recovery Rate (Percentage)	Recovery Tons In 2020 (Tons)	Expected Emissions Reduction ($MTCO_2e$)
HDPE	0.80	132,400	64%	84,800	67,800
PET	1.40	99,700	64%	63,800	89,400
Aluminum cans and nonferrous metals	12.90	76,600	80%	61,200	790,100
Steel cans and ferrous metals	1.50	863,500	64%	552,700	829,000
Glass containers	0.20	248,600	10%	24,900	5,000
Cardboard and paper bags	5.00	1,355,400	40%	542,200	2,710,800
Magazines and catalogs	0.30	143,800	14%	20,100	6,000
Newsprint	3.40	265,700	14%	37,200	126,500
Office paper	4.30	518,300	14%	72,600	312,000
Phone books	2.70	16,200	14%	2,300	6,100
Dimensional lumber	0.21	647,800	43%	278,500	58,500
Total Available Tons/ Total Achievable GHG Reduction		4,368,000	**Total Recovery Tons/ Total Expected GHG Reduction**	1,740,200	5,001,200
Total Tons Managed		27,882,500	**Total Tons Managed**	27,882,500	

Source: Values in this table are taken from Appendix I and have been rounded.

The estimates of required recovered tonnage were based on Cascadia Waste Consulting Group's (Cascadia) waste composition profile and the RERFs identified above. Cascadia was the subcontractor to HF&H. Note that Table V-5 presents 11 materials types (not the 19 in Table V-1) because it was determined that it is more likely that businesses will recycle these 11 material types; also RERFs are not currently available for all 19 categories. In addition, analysis of what is currently being recycled shows that the available RERFs cover over 95 percent of what is being recycled when concrete, an inert material with an emission factor of zero, is excluded from the calculation.

d. Self-Haul of High-Value Commodities

S2.1 and S2.2 estimate the cost impact of a low to modest increase in the recovery of high-value commodities by businesses self-hauling compared to self-haul assumptions in S2. Self-haul refers to recycling services that are performed by parties other than the local government or franchise waste hauler. Included under "self-haul is self-haul, back-haul, voluntary-haul, donated material, and many forms of recycling. Based on the CalRecycle 2008 waste characterization study, all forms of self-haul account for about 30 percent of the commercial solid waste handling. The remaining 70 percent is handled by commercial or governmental hauling services. As shown in Table V-4, ARB staff's phone survey results identified the same ratio of 30 percent self-haul and 70 percent commercial-haul in areas with mandatory commercial recycling programs.

Based on the above information, staff assumed that a 30 percent self-haul would represent a "low" level of self-haul. Staff assumed that a slightly greater level of self-haul, would represent a "moderate' level of self-haul. Given the greater potential to obtain revenue by businesses targeting high value recyclables, staff believes that it is likely to have a moderate level of self-haul. The self-haul tonnages for S2, S2.1, and S2.2 are shown in Table V-6. As shown in Table V-6, S2.1 assumes a low level of self-haul of between 23 to 30 percent and, S2.2 assumes a moderate level of self-haul of between 29 to 42 percent.

Table V-6. Comparison of Self-Haul Tonnages[1]

Scenario	Mixed Plastics (Tons)	Metals (Tons)	Cardboard (Tons)
S2	3,000	97,000	69,000
S2.1 (23 to 30% Self-haul)	34,000	168,000	164,000
S2.2 (29 to 42% Self-haul)	69,000	178,000	211,000

1. Values have been rounded to the nearest thousand.

The increased quantity of high-value commodities recovered via self-haul could reduce costs. It would reduce the cost of collection because the quantity of material recovered by a commercial hauler would be reduced. It would reduce the cost of processing because less material will be processed through single-stream processing; for the same

reason, it would result in cost savings by increasing the amount of material going through source-separated processing which is less costly than single-stream processing. And, it would increase the ability of business to recover some revenue from the resale of high value recyclables. All of these factors would contribute to a lower overall handling cost related to self-haul.

e. Determine Cost to Manage Recovered and Disposed Tons

The objective of the cost modeling is to estimate the statewide incremental cost to recover the quantity of additional materials identified in Table V-5. (See Table V-5, Column 6, "Recovery Tons"). Recovering this additional tonnage will result in a 5 $MMTCO_2e$ reduction in GHG emissions.

The statewide incremental cost is defined as the additional expense to collect, process, and transport the additional recovered material, adjusted by the revenue from commodity sales and disposal fee cost savings. The model estimates the additional cost to expand recycling in the commercial sector and is comprised of the following five categories:

1. Collection of recycled material: All of the capital costs, labor costs, maintenance costs, and overhead costs involved in the collection of materials from generators.

2. Processing recycled material: All of the maintenance costs, labor costs, capital costs, and overhead costs involved in the processing of portions of the solid waste stream into recyclable commodities for end use.

3. Transportation of recycled material: All of the maintenance, labor, capital, and overhead costs involved in the transportation of materials from the processor to end use. These costs are distinct from collection cost, except where materials are moving directly from the generator to market or end use.

4. Avoided disposal fee (credit): The cost savings resulting from not disposing the recycled material in a landfill.

5. Revenues from the sales of recyclable commodities (credit): The $/ton price of the commodity multiplied by the quantity of material sold.

There are five key equations which are used to estimate the results. These are listed below:

Total Tons Recovered = Total Tons Available for Recycling x Material Recovery Rate (MRR); (1)

Total Tons Managed = Total Tons Disposed + Total Tons Recovered; (2)

Total System Cost (w/o regulation) = Collection Cost + Disposal Cost; (3)

Total System Cost (w/ regulation) = Collection Cost$_{\text{solid waste and recyclables}}$ + Processing Cost + Transportation Cost + Disposal Cost + Revenue $_{\text{sale of recyclable commodities}}$ + Avoided Disposal Fee (credit); and, (4)

Statewide Incremental Cost = Total System Cost (w/ regulation) - Total System Cost (w/o regulation). (5)

f. Annual Compliance Costs 2012 through 2020

The projected annual compliance costs for 2012 through 2020 were estimated assuming a phased-in linear implementation profile. The linear profile was chosen after staff evaluated the implementation of past regulations, including the landmark AB 939 in 1989. AB 939 called for 50 percent diversion rate by the year 2000, and it took Californians 15 years to reach this goal. Under the linear approach, there are nine years between 2012 and the end of 2020 to reach the specified GHG reduction target. The annual ramp up rate for the amount of recycled material is then determined by dividing 100 percent implementation by nine years, which is approximately an 11 percent increase per year.

The proposed regulation will require additional recycling. The 1.7 million tons goal under S2.1 and S2.2, which focuses on the traditional recyclables and C&D wood waste, accounts for about 6 percent of the total commercial solid waste stream, or 40 percent of the targeted recyclables in the commercial solid waste stream.

The annual compliance cost was estimated using the HF&H cost model and the assumptions described earlier. The cost estimates include the cost associated with collection, processing, transportation, disposal/avoided disposal, and revenue from the sale of recyclable commodities. Costs from the HF&H model and HF&H report were in 2008 dollars. Staff adjusted the cost to 2010 dolars using consumer price index (CPI) and the factor used is 1.0244.

2. Results

a. Scenario 2.1, 2.2 – Compliance Cost to Affected Businesses

The cost analysis presented here is based on S2.1 and S2.2, i.e., recycling traditional recyclables and C&D with higher recovery rates for high value recyclables and low to moderate levels of self-haul. Under S2.1 and S2.2, the materials targeted for recovery are: paper, cardboard, metals, mixed plastic, glass and discarded C&D materials (principally wood waste) with higher recovery rate for high value recyclables [aluminum cans and nonferrous materials, steel cans and ferrous materials, plastics (HDPE and PET), and wood waste] as shown previously in Table V-3. The cost results were derived using the data presented in Tables V-1 through V-6 and the five equations stated above.

S2.1 and S2.2 were selected as staff's "best estimate" scenarios because they have the lowest statewide incremental costs and rely on traditional recyclables plus wood waste for which there are already well-developed infrastructures. Summary tables of the cost model results for S2.1 and S2.2 are shown in Table V-7 and Table V-8, respectively. The first row of data in the tables shows the tonnages of the solid waste stream, the recyclables, and the recovered tonnage to reach the 5 $MMTCO_2e$ goal under S2.1 and S2.2, respectively. The subsequent rows of data titled with "Subtotal" contains the subtotal costs for collection, processing, transportation, disposal, and commodity value. Lastly, the total and per ton costs in 2020 for each material type, as well as the total statewide (system) costs, are shown on the last two rows in the tables.

Some key data shown in Table V-7 and Table V-8 includes:

- Total tons targeted for recovery under S2.1 and S2.2 in 2020 is 1,740,218 tons.
- Total tons of commercial solid waste projected to be disposed in California without the proposed regulation is 27,882,502;
- When comparing the $/ton material costs, the analysis indicates that glass is the most expensive to recycle, at about $255/ton for S2.1 or S2.2, and recycled mixed plastics yields the greatest net revenue (savings) at about $150/ton for S2.1 to $200/ton for S2.2.
- The cost to collect and process wood waste (C&D) is significantly less than the cost to collect and process most other materials, making it an economically attractive recoverable commodity.

Table V-7. Statewide Costs for Scenario 2.1 in 2020

S2.1	State of California								
	Solid Waste	Paper	Card-board	Metals	Wood Waste	Mixed Plastics	Glass	Total RECOVER-ED	TOTAL
Tons Managed	26142284	132157	542160	613903	278533	148605	24860	1740218	27882502
Annual Subtotal (2010$)									
Collection	1,484,363,000	23,035,000	68,235,000	73,924,000	2,912,000	20,725,000	4,387,000	193,218,000	1,677,581,000
Processing	N/A	10,714,000	34,363,000	36,782,000	6,415,000	9,755,000	2,001,000	100,029,000	100,029,000
Transportation	N/A	1,991,000	8,153,000	9,060,000	4,917,000	2,237,000	414,000	26,772,000	26,772,000
Disposal	1,165,007,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,165,007,000
Commodity	N/A	-18,304,000	-56,651,000	-136,429,000	-556,000	-54,677,000	-458,000	-267,076,000	-267,076,000
TOTAL Annual Cost	2,649,369,000	17,436,000	54,100,000	-16,664,000	13,688,000	-21,961,000	6,343,000	52,943,000	2,702,312,000
TOTAL Cost/ per Ton	101	132	100	-27	49	-148	255	30	97

1. Costs are rounded.

S2.1 and S2.2 assumes the same type and amount of material recovered due to the proposed regulation. The difference in cost between the scenarios are due to differences in the amount of self-haul for high value recyclable material. In S2.1, the amount of self-haul for these materials is low while, in S2.2 the amount of self-haul is considered moderate. This is reflected in lowered collection, processing, and total costs in S2.2 as shown in rows 3, 4, and 8 of Table V-8.

Table V-8. Statewide Costs for Scenario 2.2 in 2020[1]

S2.2	State of California								
	Solid Waste	Paper	Card-board	Metals	Wood Waste	Mixed Plastics	Glass	Total RECOVER-ED	TOTAL
Tons Managed	26142284	132157	542160	613903	278533	148605	24860	1740218	27882502
Annual Subtotal (2010$)									
Collection	1,484,363,000	23,041,000	59,760,000	72,202,000	2,910,000	15,548,000	4,391,000	177,850,000	1,662,213,000
Processing	N/A	10,714,000	31,233,000	36,033,000	6,415,000	7,525,000	2,001,000	93,921,000	93,921,000
Transportation	N/A	1,991,000	8,153,000	9,060,000	4,917,000	2,237,000	414,000	26,772,000	26,772,000
Disposal	1,165,007,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,165,007,000
Commodity	N/A	-18,304,000	-56,651,000	-136,429,000	-556,000	-54,677,000	-458,000	-267,076,000	-267,076,000
TOTAL Annual Cost	2,649,369,000	17,442,000	42,494,000	-19,134,000	13,686,000	-29,368,000	6,346,000	31,467,000	2,680,836,000
TOTAL Cost/ per Ton	101	132	78	-31	49	-198	255	18	96

2. Costs are rounded.

The statewide total costs for business as usual (BAU or Without Regulation) are shown in Table V-9. At full implementation in 2020, the total costs to collect and dispose of 28 million tons of solid waste in 2020 is estimated to be $2,661,000,000 in 2010 dollars.

Table V-9. Statewide Costs for Disposal of Commercial Solid Waste Without the Proposed Regulation in 2020[1]

State of California	
BAU	Total
Tons Managed (Tons)	27,883,000
Annual Subtotal (2010$)	
Collection	$1,418,000,000
Processing	N/A
Transportation	N/A
Disposal	$1,243,000,000
Commodity	N/A
Total Annual Cost	$2,661,000,000
Total Cost per Ton	$95.42

1. Tonnage and cost values have been rounded.

The increase in solid waste management costs, compared to the Without Regulation baseline, in 2020 for S2.1 and S2.2, are shown in Table V-10. The difference between total cost under each of these scenarios, and the total cost without the proposed regulation, is the estimated annual cost that affected businesses would incur to comply with the proposed regulation at full implementation in 2020. As shown in Table V-10, the estimated compliance costs for affected businesses in 2020 is between $20 and $42 million.

Table V-10. Compliance Cost for Affected Businesses in 2020[1]

	Total System Cost	Compliance Cost (Cost Over BAU)
BAU (without regulation)	$2,661,000,000	N/A
Scenario 2.1 (low self-haul)	$2,702,000,000	$42,000,000
Scenario 2.2 (moderate self-haul)	$2,681,000,000	$20,000,000

1. Cost values have been rounded to the nearest million.

b. Compliance Costs to Affected Businesses 2012 to 2020

Table V-11 shows the annual compliance costs to affected businesses from 2012 through 2020 under both S2.1 and S2.2. These costs were calculated using HF&H's cost model and have been revised to reflect 2010 dollars. The net present values of the costs from 2012 to 2020 for S2.1 and S2.2 are also shown in Table V-11. The net present value is calculated using a 5% discount rate.

Table V-11. Annual Compliance Cost for Affected Businesses 2012 to 2020[1,2]

Year	Annual Costs or Savings (Million $)		Recovered Material (Million Tons)	GHG reduced ($MMTCO_2e$)	Implementation Rate
	S2.1 (low self-haul)	S2.2 (Moderate self-haul)			
2012	-$123	-$141	0.19	0.55	11%
2013	-$107	-$125	0.39	1.11	22%
2014	-$87	-$106	0.58	1.67	33%
2015	-$69	-$88	0.77	2.22	44%
2016	-$49	-$68	0.97	2.78	56%
2017	-$28	-$48	1.16	3.33	67%
2018	-$5	-$26	1.35	3.89	78%
2019	$18	-$3	1.55	4.44	89%
2020	$42	$20	1.74	5	100%
Total (2012-2020)	-$408	-$585	8.70	25	
NPV (2012-2020)	-$369	-$508			

1. Values rounded.
2. Costs do not include program administration costs to jurisdictions.

As shown in Table V-11, it is estimated that there will be a net savings to businesses over the implementation period from 2012 through 2020. The net present value of the

total savings in 2010 dollars is between $370 million and $508 million. These costs were derived assuming that the overall change in cost over time for Scenario 2.1 and 2.2 would be similar to what was obtained for Scenario 2 using the HF&H cost model. Note that net cost savings result in the early years of implementation due to utilization of the existing collection system capacity. Increased self-haul creates more slack capacity in existing equipment such as front-end loaders, bins, and collection vehicles which delays collection cost increases to later years.

D. Compliance Costs to Local, State, and Federal Entities

This section discusses the methodology for and results of staff's analysis of the costs to local, State (including school districts, colleges, and universities), and federal entities to comply with the proposed regulation.

1. Methodology and Results – Compliance Costs to Public Entities

To determine statewide compliance costs to local, State (including school districts, colleges, and universities), and federal entities, staff reviewed all regulations and orders pertaining to recycling that could impact these entities. Each of the public agencies mentioned, except for school districts and the University of California (UC), already have mandates to recycle. These mandates are summarized below and discussed in Chapter II of this report. Also discussed below is the methodology used to determine if school districts and the UC campuses would incur costs to comply with the proposed regulation.

Local Agencies: Local governmental agencies are subject to the existing AB 939 waste diversion mandate of 50 percent. Among a number of programs implemented to achieve this diversion requirement, nearly all jurisdictions operate in-house source reduction, recycling and/or composting programs, and report on the progress of each in an annual report to CalRecycle. Further, staff found that none of the 46 commercial recycling ordinances adopted by local jurisdictions exempted governmental agencies from complying with the requirements of the ordinance. As a result, staff anticipates that local agencies are already involved in recycling activities and, therefore, will not incur any additional costs to comply with the proposed regulation.

State Agencies: Similar to local agencies, State agencies are subject to the existing AB 939, 50 percent, waste diversion mandate.[3] Under AB 75, State agencies are required to develop and implement an integrated waste management plan and to submit an annual progress report to CalRecycle. Currently in 2011, all State agencies, except for one, are in compliance with the AB 75 diversion mandates. As a result, staff

[1] Includes by definition those campuses of the California State University and the California Community Colleges, prisons within the Department of Corrections, facilities of the State Department of Transportation, and facilities of other state agencies, that CalRecycle determines are primary campuses, prisons, or facilities; every state office, department, division, board, commission, or other agency of the state, including the California Community Colleges and the California State University (the Regents of the University of California are encouraged to implement this division); and a community service district that provides solid waste handling services or implements source reduction and recycling programs.

anticipates that State agencies are already involved in recycling activities and, therefore, will not incur any additional costs to comply with the proposed regulation.

Colleges and Universities: California community colleges and State universities are State agencies and therefore must meet the AB 939 50 percent waste diversion mandate as well as requirements under AB 75. However, the ten Universities of California (UCs) are not considered State agencies and are not under any State mandate to recycle. To assess the potential impacts of the proposed regulation on the UCs, staff researched the websites of all ten UCs to determine if they had existing recycling programs. We found that all UCs already have recycling programs in place. As a result, staff anticipates that all State community colleges, State universities, and all UC campuses are already involved in recycling activities and, therefore, will not incur any additional costs to comply with the proposed regulation.

School Districts: While K-12 school districts or schools are encouraged to reduce their waste in both the California Education and Public Resources Codes, there is currently no specific mandate that would require schools to recycle. The proposed regulation would apply recycling requirement to school sites that generate 4 cubic yards or more of solid waste per week. To assess costs, staff conducted a survey of California K-12 school districts to determine:

- The extent of recycling that is occurring in K-12 schools; and
- The incremental cost to schools/school districts to meet the proposed regulation.

For the survey, staff divided the State into six regions to ensure representation across the State. Staff also used the California Department of Education's Educational Demographics Unit database (http://dq.cde.ca.gov/dataquest) to access student enrollment by county, school district, and school. For each of these six regions, staff selected a large, medium, and small school district based on the student enrollment and called these school districts to inquire about the extent of recycling in the district.

The results of the survey are presented in Appendix C. Survey results indicate that recycling in school districts is pervasive throughout California. Staff called 21 school districts and was able to successfully survey 18 school districts. Of the 18 responses received, each indicated that recycling is occurring in the district. Based on conversations with the district representative, staff believes that the current level of recycling will meet the requirements of the proposed regulation. As a result, staff anticipates that schools and school districts are already involved in recycling activities and, therefore, will not incur any additional costs to comply with the proposed regulation.

Federal Government Agencies: There is an existing federal goal of 50 percent recycling and waste diversion by 2015. As outlined in Chapter II of this report, Executive Order 13514 establishes sustainability goals for federal agencies and focuses on making improvements in their overall environmental, energy and economic

performance. As a result, staff anticipates that federal agencies are already involved in recycling activities and, therefore, will not incur any additional costs to comply with the proposed regulation.

E. Implementation Costs for Local Jurisdictions, CalRecycle, and ARB

This section describes methodology and results used to estimate the implementation costs due to the proposed regulation for local jurisdictions, CalRecycle, and ARB.

1. Methodology - Implementation Costs

a. Local Jurisdictions

CalRecycle and ARB staff prepared and disseminated a survey to solicit information from local jurisdictions to estimate costs for local jurisdictions to implement the education, outreach and monitoring requirements of the proposed regulation. The survey questions focused on the initial start-up costs and annual on-going costs for jurisdictions to provide web-based recycling information, printed informational materials, and direct contact with businesses and monitoring of program participation. A copy of the survey questions is provided in Appendix D.

The survey was sent to the 46 local jurisdictions with existing mandatory commercial recycling ordinances or commercial recycling programs. About 20 jurisdictions provided data for the survey. The responding jurisdictions represent various regions of the State, different size communities, different service and infrastructure (exclusive franchise, and open market), and various types of jurisdiction (city, unincorporated county, and regional agency).

In the review of the survey responses, staff found that:

- Most jurisdictions, as a result of AB 939, have existing education and outreach programs targeting the commercial sector. Therefore, costs are not necessarily starting from zero because most jurisdictions already have web information and printed materials targeting commercial recycling or that can be easily updated to include the requirements of the proposed regulation.

- Most responders stated that activities required by the proposed regulation are already incorporated (or would be in the near future) into existing duties and materials used for current waste management programs.

The responding jurisdictions were separated into three categories, small, medium, and large based on population. Small jurisdictions were those with a population of less than 35,000. Medium jurisdictions were those with a population of between 35,000 and 200,000. Large jurisdictions were those with a population of more than 200,000.

The survey responses were analyzed by activity (web-based resources, printed material, and direct contact/monitoring) and by jurisdiction size. Staff calculated the average cost for each activity by jurisdiction size and multiplied that cost by the number of impacted jurisdictions in the size range. The number of impacted jurisdictions was adjusted by subtracting the number of jurisdictions that already have ordinances or commercial recycling programs from the total number of jurisdictions in each size range. The cost for each jurisdiction size range was then summed to estimate the total statewide cost to jurisdictions to implement the proposed regulation.

When costs were reported as being "incorporated into the existing staff duties or materials," an effort was made to quantify the person year (PY) associated to each activity and the pay scale for the activity. For jurisdictions in which the hauler/service provider carries out the required activities and the related costs are passed through to the customers in the form of rates, staff assumed the costs would be the same as a similar size jurisdiction with a similar program. The cost estimates do not take into account revenue received by local jurisdictions in terms of franchise fees, AB 939 fees, or other funding mechanisms supporting such programs.

The results from the survey were used to estimate the implementation cost to local jurisdictions at full implementation of the proposed regulation in 2020. The projected annual compliance costs for 2012 to 2020 were estimated assuming a phased-in linear implementation profile of 11 percent per year beginning in 2012.

b. CalRecycle

Staff used the implementation costs from AB 939 as a basis for estimating costs for implementing this regulation. During the first year following adoption, resources will be needed to provide guidance to jurisdictions and businesses, including regional rule implementation workshops and other outreach activities, and developing web-based tools. Beginning in late 2012, resources will be needed to review annual reports from over 500 jurisdictions, conduct review and evaluation of jurisdictions' program implementation, and conduct associated compliance activities as needed. The costs associated with these resources can be absorbed within the existing CalRecycle budget, which includes 2 PYs funded by the AB 32 Cost of Implementation fee. The remaining 3 PYs will come from redirection of existing resources and efficiencies improvement with the AB 939 program.

c. ARB

Based on the proposed regulation, ARB involvement should not be substantial in the first three years. However, because ARB is required to retain oversight of the program and may be called upon to enforce the proposed regulation, ARB estimates that about 1 PY would be needed in the 2011- 2020 timeframe. ARB plans to meet the staffing need with existing staff.

2. Results – Implementation Costs

a. Local Jurisdictions

There are currently 537 local jurisdictions in California responsible for solid waste management. Of these, 46 jurisdictions already have recycling programs in place that are similar to the proposed regulation. In performing the cost estimate, staff assumed that that 28 of these jurisdictions, or 68 percent, would not incur additional costs to implement the proposed regulation. Therefore, it is estimated that about 509 local jurisdictions will incur costs implementing the proposed regulation.

The startup costs assessed from the CalRecycle survey are summarized in Table V-12. As shown in the table, the total startup cost for all the jurisdictions is anticipated to be about $13.3 million. The average start-up cost per jurisdiction was also calculated based on the jurisdiction size and is shown on the last column of the table. These costs will occur over the 2012 - 2020 time period.

Table V-12. Start-Up[1,2] Cost for Local Jurisdictions

Jurisdiction Size	Web Page Cost	Printed Material Cost	Contact & Monitoring Cost[3]	Total Cost	Average Cost
Small (264)[4]	$126,720	$927,960	$2,283,600	$3,338,280	$12,645
Medium (222)[4]	$466,200	$1,609,500	$5,299,140	$7,374,840	$33,220
Large (23)[4]	$27,600	$121,900	$2,495,500	$2,645,000	$115,000
Total Cost	$620,520	$2,659,360	$10,078,240	**$13,358,120**	

1. Based on survey of jurisdictions with mandatory commercial recycling ordinances or strong voluntary commercial recycling programs.
2. Actual costs will vary based on individual jurisdiction's program requirements.
3. Some jurisdictions included enforcement costs which are not required by the proposed regulation.
4. The number of jurisdictions was estimated by subtracting the total number from those that would not be impacted.

The anticipated annual implementation costs at full implementation in 2020 were also calculated based on survey results. These costs are summarized in Table V-13. As shown on the table, the annual implementation costs for all the impacted jurisdictions are anticipated to be about $11.6 million in 2020. The average annual costs by jurisdiction size are shown in the last column of the table.

Table V-13. Annual Implementation Costs for Local Jurisdictions in 2020[1,2]

Jurisdiction Size	Web Page Cost	Printed Material Cost	Contact & Monitoring Cost[3]	Total Cost	Average Cost
Small (264)[4]	neg.	$917,400	$2,283,600	$3,201,000	$12,125
Medium (222)[4]	$97,680	$999,000	$4,695,300	$5,791,980	$26,090
Large (23)[4]	$11,270	$121,900	$2,458,700	$2,591,870	$112,690
Total Cost	$ 108,950	$ 2,038,300	$ 9,437,600	**$11,584,850**	

1. Based on survey of jurisdictions with mandatory commercial recycling ordinances or strong voluntary commercial recycling programs.
2. Actual costs will vary based on an individual jurisdiction's program requirements.
3. Some jurisdictions included enforcement costs which are not required by the proposed regulation.
4. The number of jurisdictions was estimated by subtracting the total number from those that would not be impacted.

Assuming a two year start-up cost profile and then a linear profile (11 percent per year beginning in 2012) for annual implementation costs, the total annual implementation cost for local jurisdictions for 2012 - 2020, and the net present values for the start-up, annual, and total implementation cost are shown in Table V-14.

Table V-14. Annual Implementation Cost to Local Jurisdictions 2012 - 2020[1]

Year	Start-up Cost	Annual Cost	Total Implementation Cost
2012	$6,679,000	$0	$6,679,000
2013	$6,679,000	$1,448,000	$8,127,000
2014	$0	$2,896,000	$2,896,000
2015	$0	$4,344,000	$4,344,000
2016	$0	$5,792,000	$5,792,000
2017	$0	$7,241,000	$7,241,000
2018	$0	$8,689,000	$8,689,000
2019	$0	$10,137,000	$10,137,000
2020	$0	$11,585,000	$11,585,000
Total (2012 to 2020)	**$13,358,000**	**$52,132,000**	**$65,490,000**
NPV (2012 to 2020)	**$12,419,000**	**$37,834,000**	**$50,253,000**

1. Rounded to the nearest 1,000.

Specific costs to individual jurisdictions will likely vary due to unique circumstances. It is anticipated that many jurisdictions will experience lower costs than estimated here. Some of the jurisdictions reported costs which included costs associated with enforcement activities. In most cases, it was not possible to estimate just the enforcement cost. Since the proposed regulation does not required local jurisdictions to enforce the requirements, inclusion of these costs will result in an over estimation of implementation costs (see discussion on section J.2). At the same time, jurisdictions with commercial recycling in open market systems may have increased costs compared to those with exclusive franchise systems. This may be attributable to the more intensive planning and coordination required to develop education, outreach, and

monitoring among multiple haulers/service providers and the variety of programs offered by each.

b. CalRecycle

CalRecycle will require approximately $625,000 (5 PYs) on an ongoing fiscal year basis to implement and enforce the proposed regulation. These costs can be absorbed within the existing CalRecycle budget, which includes 2 PYs funded by the AB 32 Cost of Implementation fee. The remaining 3 PYs will come from redirection of existing resources and efficiencies improvement with the AB 939 program. In both FY 2014/15 and FY 2019/20, new expenditure authority and contractual resources of approximately $1 million will be needed to conduct statewide characterization studies to determine the overall effectiveness of the proposed regulation in achieving the emissions reduction target. Approximately $50,000 or 0.5 PY will be needed to oversee the studies.

c. ARB

Based on the methodology discussion above, it is anticipated that implementing the propose regulation may require 1 PY at a cost of $175,000 per fiscal year. This cost can be met within the current budget.

F. Total Costs to Affected Businesses and Local Jurisdictions

The total costs to comply with and implement the proposed regulation are discussed below.

1. Methodology – Total Costs

Staff summed the net present value of the annual compliance costs for affected businesses (Table V-11) and the net present value of the total implementation costs for local jurisdictions (Table V-14) to determine the net present value of the total costs to comply with and implement the proposed regulation. Using the net present value of the total costs to comply with and implement the proposed regulation, the equivalent annual cost was calculated[4]. Staff used the best estimate scenarios, S2.1 and S2.2, to calculate the range of expected total costs. The costs are in 2010 dollars.

The costs to affected businesses due to statewide recycling system cost increases were presented in Section C. The cost methodology considers all costs incurred in collecting, transporting, processing, disposal/avoided disposal, and commodity revenue of a sufficient amount of commercial solid waste to meet a target of reducing 5 $MMTCO_2e$. In the case of Scenarios 2.1 and 2.2, this is about 1.7 million tons. The costs were then offset by the value of recycled materials sold as commodities, and by reduced landfill disposal costs.

[4] For definition of equalivent annual cost see: http://en.wikipedia.org/wiki/Equivalent_annual_cost

The total costs to local jurisdictions were taken from estimates presented in Section E, and were based on a survey of local jurisdiction which obtained information on costs to implement existing commercial recycling programs. The survey questions focused on the initial start-up and subsequent annual operating costs for jurisdictions to implement commercial recycling web-based information systems, printed materials, and direct contact/monitoring activities.

To determine whether the local jurisdictions' implementation costs would be passed onto the affected businesses, staff worked with HF&H to analyze how local jurisdictions fund their recycling costs.

2. Results – Total Costs

The total cost to implement the proposed regulation over the period from 2012 through 2020 is estimated to be a savings of between $343 million to $519 million (NPV: -$320 million to -$458 million) including total jurisdiction costs of $65 million (NPV: $50 million). The average annual costs to businesses from 2012 through 2020 are estimated to be a savings of $38 million to $58 million (equivalent annual costs: -$45 million to -$65 million), including average jurisdiction costs of $7 million, which is the same as the equivalent annual costs. These costs are presented in Table V-15. These total cost savings represent about an annual 2 to 3 percent decrease over the current statewide commercial solid waste management costs of $2.6 billion.

Table V-15. Total Program Costs to Affected Businesses and Local Jurisdictions

	Average Annual Costs (Million $)	Cumulative Costs for 2012-2020 (Million $)
Systemwide Costs (from CalRecycle and ARB staff's analysis using HF&H's cost model)	-$45 to -$65 (-$52 to -$72)[1]	-$408 to -$585 (-$370 to -$508)[1]
Jurisdiction Costs	$7 ($7)[1]	$65 ($50)[1]
Total Cost to Affected Businesses[2]	-$38 to -$58 (-$45 to -$65)[1]	-$343 to -$519 (-$320 to -$458)[1]

1. Values in parentheses are NPV (net present value) and equivalent annual costs based on NPV.
2. Business as defined by the proposed regulation, includes businesses, public entities, and multifamily complexes.

Based on HF&H's survey conducted as part of the Cost Study project, it was determined that all 306 survey participants recover the operational costs of their commercial solid waste and recycling program through the rates charged to customers by the service provider. (HF&H, 2011) Therefore, it is concluded that jurisdictions would recover their costs from rates and fees. As a result, the impact to affected businesses is the sum of program costs and jurisdiction costs. The annual program costs to affected businesses and local jurisdictions are shown in Table V-16.

Table V-16. Annual Program Costs 2012 - 2020

Year	Affected Businesses Compliance Costs (Million $)		Local Jurisdiction Implementation Costs (Million$)	Total Costs to Impacted Businesses (Million $)	
	S2.1	S2.2		S2.1	S2.2
2012	-$123	-$141	$7	-$117	-$135
2013	-$107	-$125	$8	-$98	-$117
2014	-$87	-$106	$3	-$85	-$103
2015	-$69	-$88	$4	-$64	-$83
2016	-$49	-$68	$6	-$43	-$62
2017	-$28	-$48	$7	-$21	-$41
2018	-$5	-$26	$9	$4	-$17
2019	$18	-$3	$10	$28	$7
2020	$42	$20	$12	$53	$32
Total Cost (2012-2020)	-$408	-$585	$65	-$343	-$519
NPV (2012-2020)	-$370	-$508	$50	-$320	-$458

G. Cost-Effectiveness

AB 32 requires the Board to consider cost-effectiveness of each GHG control measure it adopts. Cost-effectiveness of recycling systems is typically measured in terms of the cost per ton of material recycled. Another way to express cost-effectiveness, which is appropriate for measures designed to reduce GHG, is as the ratio of total program costs to tons of GHG ($MTCO_2e$) reduced.

Staff used S2.1 and S2.2 to estimate the overall cost-effectiveness of the proposed regulation. The values were calculated for these two scenarios assuming full compliance at year 2020 and were determined by dividing the total compliance and implementation costs shown in Table V-16 by the total tons recycled (2012-2020) or by 25 $MMTCO_2e$ (2012-2020).

Table V-17 shows the cost-effectiveness from 2012 through 2020 as both dollars per $MTCO_2e$ reduced (column 6) and as dollars per ton of recovered (recycled) material (column 5). As shown on Table V-17, the GHG cost-effectiveness is estimated to be a savings of $14 to $21 (NPV: $13 to $18) per metric ton of GHG reduced. The estimated savings to recover each ton of recyclable material range from $39 to $60 (NPV: $37 to $53) per ton.

Table V-17. Estimated Cost-Effectiveness from 2012 - 2020[1,2]

2012-2020 Scenario	Total Cost (Million $)	Total Recovered (Million Tons)	Total GHG Reduced (MMTCO2e)	Cost-Effectiveness	
				Per Ton Recycled	Per MTCO2e Reduced
S2.1	-$343 (-$320)	8.70	25	-$39 (-$37)	-$14 (-$13)
S2.2	-$519 (-$458)	8.70	25	-$60 (-$53)	-$21 (-$18)

1. Values are rounded.
2. NPV (net present value) and equivalent annual costs based on NPV in parentheses.

A separate cost effectiveness calculation was made for the proposed regulation in 2020 at full implementation. Table V-18 shows the results of that calculation.

Table V-18. Estimated Cost-Effectiveness in 2020[1]

2020 Scenario	Total Cost (Million $)	Total Recovered (Million Tons)	Total GHG Reduced (MMTCO2e)	Cost-Effectiveness	
				$ Per Ton Recycled	$ Per MTCO2e Reduced
S2.1	$53	1.74	5	31	11
S2.2	$32	1.74	5	18	6

1. Values are rounded.

The cost-effectiveness for a specific business or jurisdiction may vary significantly based on a number of factors including program design, regional disposal and recycling infrastructure, regional pricing, business terms of collection or processing agreements, incentive pricing strategies (subsidies to reduce the price of recycling to the customer), and jurisdictional fees (franchise payments, AB 939, contract management fees) included in collection rates.

H. Average Costs/Savings for Affected Businesses

In this section, the methodology for and results of the analysis used to estimate average compliance costs for affected businesses, including multifamily complexes, are discussed. The average compliance cost is calculated by taking the total costs for affected businesses identified in Section F, and dividing those costs by the number of business that are likely to incur costs to comply with the proposed regulation.

The "Methodology" subsection discusses how staff estimated the number of affected businesses. Different methodologies were used to determine the number of affected commercial businesses and the number of multifamily complexes that would need to take actions to comply with the proposed regulation. The "Results" subsection provides the estimated average compliance costs for all affected business, both commercial businesses and multifamily complexes.

As discussed earlier, public entities, UCs, and school districts are anticipated to have no or minimal costs associated with complying with the proposed regulation because they have already taken action to institute recycling programs. Therefore, staff did not include the number of public entities when determining the total number of affected sources.

1. Number of Affected Commercial Businesses – Methodology and Results

Because the amount of solid waste generated varies by the type of business, the first step in determining the number of affected businesses is to determine the disposal rates by business category (groupings of similar types of business with similar solid waste generation characteristics). This involves determining, for each business category, the number of businesses, the number of employees, and how much solid waste is generated per employee. In step 2, the threshold number of employees that would generate at least 4 cubic yards of solid waste per week is determined. This "threshold value" will vary by business category. In step 3, the number of businesses in each business category that exceeds the threshold value is determined. In step 4, the number of businesses likely to generate at least 4 cubic yards of solid waste per week obtained in step 3 was adjusted (downward) to account for the businesses that are located in the 28 jurisdictions that already have commercial recycling programs similar to the proposed regulation. About 11 percent of the businesses representing about 11 percent of the commercial waste generated are estimated to be located within these 28 jurisdictions. All businesses located outside these 28 jurisdictions are assumed to be affected businesses and will need to take action to comply with the proposed regulation.

Step 1 - Developing disposal rates for businesses

CalRecycle has collected data on disposal rates for various types of businesses through numerous waste characterization studies conducted over the past 11 years. The rates are expressed in terms of the amount (pounds or tons) of solid waste disposed by business type.

In these waste characterization studies, business types were identified using standard industrial classification (SIC) codes, and business types with similar waste streams characteristics were grouped together. For example, financial, insurance, real estate, and legal businesses were grouped together since they are all office-type businesses and generate similar types of waste. In total, 39 business categories were created for the waste characterization studies.

The data from the waste characterization studies was combined with Employment Development Department (EDD) employment information to estimate the amount of waste disposed by business category. However, the business categorization method used in the waste characterization studies needed to be "translated" to be compatible with the business categorization method used by EDD.

In 2009, a new system of classifying businesses, the North American Industrial Classification System (NAICS), was adopted by the U.S. Census Bureau. Employment data for California is now reported by EDD using this system. Since business disposal rates were developed using SIC codes, the disposal rate information for individual businesses had to be "translated" to match the new NAICS industrial classification system. This was done by HF&H as part of the cost study. The methodology used to do this can be found in the HF&H report.

Because the disposal rates were based on weight, and the Commercial Recycling Regulation is based on volume (cubic yards per week), the weight data was converted to volume using density factors obtained from other disposal studies. Once this conversion was made, the average disposal per employee was derived for each of 19 NAICS business categories.

Step 2 – Determining average number of employees generating at least 4 cubic yards of solid waste per week.

The weekly per employee disposal rates for each business category developed in step 1 was used to estimate the number of employees, by business category, which would generate at least 4 cubic yard of solid waste per week. This "threshold value" will vary by business category.

Step 3 – Determining number of business in each business category meeting the threshold value

The EDD data contains information on the total number of businesses in a business category and information on the distribution of the number of employees per business. Applying the "threshold value" determined in step 2 to the EDD data allowed staff to determine the number of businesses in each business category that had employment levels that meet or exceed the threshold values. This number represents the estimated number of businesses that would generate at least 4 cubic yards of solid waste per week and therefore be subject to the proposed regulation.

The estimated number of businesses, by business category, that would generate at least 4 cubic yards of solid waste per week was reduced by 11 percent. The 11 percent reduction accounts for businesses located in the 28 jurisdictions that already have a commercial recycling program comparable to the proposed regulation and therefore are not anticipated to be impacted by the proposed regulation.

Table V-19 shows the estimated total number of affected commercial businesses to be 251,545 based on the methodology discussed above. Included in Table V-18 are the business categories (column 2), the threshold number of employees that would generate at least 4 cubic yards of solid waste per week (column 3), the total number of businesses in a business category (column 4), and the total number of affected commercial businesses in a each business category (column 5).

Table V-19: Estimated Number of Affected Commercial Businesses

NAICS Code	Business Category	Threshold no. of Employees for 4 cy/wk[1]	Total Businesses in Category	Total Affected Businesses
	Total All Industries		1,162,361	251,545
11	Agric., Forestry, Outdoor Rec.	10	15,760	5,190
21	Mining	10	657	308
22	Utilities	10	1,011	428
23	Construction	4	67,822	27,283
31-33	Manufacturing	10	38,963	19,253
42	Wholesale Trade	12	53,837	14,923
44-45	Retail Trade	8	90,127	40,030
48-49	Transport. & Warehousing	6	16,693	7,183
51	Information	19	17,080	2,665
52	Finance & Insurance	21	43,117	8,732
53	Real Estate, Rental & Leasing	21	39,018	6,450
54	Professional & Tech. Svcs.	12	103,500	9,919
55	Mgmt of Co.s & Enterprises	5	3,703	2,786
56	Administrative & Waste Svcs.	10	39,148	11,279
611	Educational Services	9	9,235	3,515
62	Health Care & Soc. Assistance	10	78,356	20,087
71	Arts, Entertainment & Rec.	5	16,075	5,051
72	Accommodation & Food Svcs.	4	60,566	57,213
81	Other Services	10	412,936	9,183
999	Nonclassifiable Establishments.	10	54,757	66

1. Calculated threshold numbers are rounded to the nearest whole number.

2. Number of Affected Multifamily Complexes – Methodology and Results

Multifamily complexes (apartments) with 5 or more units and that generate at least 4 cubic yards of solid waste per week would be subject to the proposed regulation. The 5 unit and 4 cubic yard per week requirement is consistent with language in several previous bills introduced in California (such as AB 737 (Chesbro) during the 2010 legislative session), although not with language introduced more recently (AB 341 (Chesbro) during the 2011 legislative session. Since most jurisdictions that have mandatory multifamily ordinances set the threshold at 5 units or lower, this requirement would not have a significant impact on these jurisdictions.

Step 1 – Determine number of units needed to generate at least 4 cubic yards of waste weekly

The first step to estimate the number of multifamily complexes that would be affected by the proposed regulation is to determine the number of multifamily complexes with 5 or more units that are likely to generate at least 4 cubic yards of solid waste per week. Using the results of the 2008 CalRecycle statewide waste characterization study, staff determined that the average waste disposal rate per residential unit in California was 0.96 tons per unit per year, or 37 pounds per unit per week. Assuming an average density of solid waste of 149 pounds per cubic yard, the 37 pounds per week value converts to an average disposal rate per residential unit of 0.25 cubic yards of solid

waste per week. Thus, multifamily complexes with 16 or more units would most likely generate 4 or more cubic yards of solid waste per week (16 x 0.25 = 4).

Step 2. Determine number of multifamily complexes with 5 or more units

The second step in determining the number of affected multifamily complexes is to determine the number of multifamily complexes in California by number of units. This data is available from the 2006-2008 American Community Survey (ACS) Census. The ACS Census data provided information on the number of multifamily complexes in California and the number of residential units per complex. California-specific data is available on the number of multifamily complexes for 2 units, 3 – 4 units, 5 – 9 units, 10 – 19 units, 20 or more units. Table V-20 shows, by unit size, the total number of units and the total number of multifamily complexes for that size in California. The last row of the table shows the total number of multifamily units and complexes in California. (ACS, 2006-2008)

Table V-20. Number of Multifamily Complexes by Number of Units in CA

Unit Size	Number of Units	Number of Multifamily Complexes
2 Units	341,935	170,968
3 to 4	759,834	217,095
5 to 9	833,279	119,040
10 to 19	704,002	50,286
20 or more	1,452,790	48,406
Total	**4,064,858**	**605,795**

Source: Units are from the 2006-2008 American Community Survey (ACS) Census data; the number of Complexes was estimated by staff

Step 3. Determine total number multifamily complexes with 5 or more units and generate at least 4 cubic yard of solid waste per week

Based on results of steps 1 and 2, the third step in estimating the number of multifamily complexes that meet the threshold requirements is to estimate the number of complexes with 16 or more units. To do this, staff needed to estimate the number of units in the 10 to 19 unit range that are 16 or more units. The ASC Census data does not provide a further breakdown of the number of multifamily complexes within the 10 to 19 size range. In the absence of this information, staff assumed an even distribution of the number of multifamily complexes in the 10 to 19 size range. Thus, 60 percent of the units were assumed to be less than 16 units and 40 percent were assumed to be greater than or equal to 16 units. Using this assumption, the number of multifamily complexes in the 16 to 19 unit range would be 20,114. Adding to this number to the number of multifamily complexes with 20 or more units (48,406), would result in an estimated 68,520 multifamily complexes that would be subject to the proposed regulation. Table V-21 shows this information in tabular form.

Table V-21. Number of Affected Multifamily Complexes

Size Range	Number of Units	Number of Multifamily Complexes
16 to 19	704,002	20,114
20 or more	1,452,190	48,406
Total	**2,156,192**	**68,520**

3. Total Number of Affected Businesses

Table V-22 presents the results of the analysis to estimate the total number of affected businesses that would need to take action to comply with the proposed regulation. This is a subset of the total number of businesses of about 1.5 million that would be impacted without the 4 cubic yards and the 5 units thresholds. As shown in Table V-22, staff estimates that about 320,000 commercial businesses and multifamily complexes would be subject to the proposed regulation because they produce at least 4 cubic yards of solid waste per week. The total number of affected businesses, 320,065, is the combination of the 251,545 commercial businesses that generated at least 4 cubic yards of solid waste per week and not located in local jurisdictions that already have a comparable commercial recycling program, and the 68,520 multifamily complexes with 5 or more units and that generate at least 4 cubic yards of solid waste per week.

Table V-22. Total Number of Affected Businesses that Generate 4 Cubic Yards

Type	Number
Commercial Business	251,545
Multifamily Complex $\geq$ 5 units	68,520
Total	**320,065**

4. Average Cost to Affected Businesses

To calculate the average annual costs to affected business, the annual costs and equivalent annual costs due to compliance cost for affected businesses and implementation cost from jurisdictions (shown in Table V-15) are divided by the total number of affected businesses calculated above. The estimated annual costs to affected businesses to comply with the proposed regulation from 2012 through 2020 is shown in Table V-23.

Table V-23. Estimated Annual Costs to Affected Business from 2012 - 2020[1,2]

Category	Estimated Annual Costs (2012-2020)
Compliance Costs for Affected Businesses	-$45 Million to -$65 Million (-$52 Million to -$72 Million)
Implementation Costs for Local Jurisdiction	$7 Million ($7 Million)
Annual Costs to Affected Businesses	-$38 Million to -$58 Million (-$45 Million to $65 Million)
Average Costs	-$119 to -$180 (-$141 to -$201)

1. NPV (net present value) and equivalent annual costs based on NPV are in parentheses.
2. Number of affected businesses is 320,065

Therefore, from 2012 through 2020, staff estimates that the annual savings to an affected business would be between $119 to $180 (equivalent savings: $141 to $201) per year or a savings of between $10 to $15 (equivalent savings: $12 to $17) per month for a commercial business and a savings of $0.4 to $0.6 (equivalent savings: $0.5 to $0.7) per month for the average family living in a multifamily complex.

Costs to businesses are estimated to gradually increase through the years until full implementation in year 2020. The estimated annual costs to affected businesses to comply with the proposed regulation in 2020 is shown in Table V-24 below.

Table V-24. Estimated Annual Costs to Affected Business in 2020[1]

Category	Estimated Annual Costs (2020)
Compliance Costs for Affected Businesses	$20 Million to $42 Million
Implementation Costs for Local Jurisdiction	$12 Million
Annual Costs to Affected Businesses	$32 Million to $53 Million
Average Costs	$99 to $166

1. Number of affected businesses is 320,065

Therefore, in 2020, staff estimates that the annual costs to an affected business would be between $99 to $166 per year or a cost of between $8 to $14 per month for a commercial business and a cost of $0.3 to $0.6 per month for the average family living in a multifamily complex.

I. Number of Small Businesses

A separate estimate was prepared for the number of "small businesses" in California that would be impacted by the proposed regulation. The number of small businesses estimate for this rulemaking used the Department of General Services' number of employee criteria. This criteria assumes that businesses that employ 100 employees or less are small businesses.

The estimated number of affected businesses that would generate sufficient waste to be subject to the proposed regulation (at least 4 cubic yards of solid waste per week) and

that have 100 employees or less, is a subset of the total number of affected businesses (251,545) that was presented in Table V-15. EDD data was used to determine the number of businesses that employ more than 100 employees for each of the business categories. The total number of business with more than 100 employees was subtracted from the total of affected businesses. As shown in Table V-25, about 246,202 of the estimated 251,545 businesses impacted, or about 93 percent of the affected businesses, can be categorized as "small businesses" using the 100 employees or fewer criterion.

Table V-25. Estimated Number of Small Businesses Impacted by the Proposed Regulation

NAICS Code	Industry	Total Businesses in Category	Total Businesses in MCR	Total Small Businesses (< 100 emp's)	Small Bus. as % of Total Businesses Affected
	Total All Industries	1,162,361	251,545	233,989	93.0%
11	Agric., Forestry, Outdoor Rec.	15,760	5,190	4,417	85.1%
21	Mining	657	308	259	84.1%
22	Utilities	1,011	428	318	74.2%
23	Construction	67,822	27,283	26,384	96.7%
31-33	Manufacturing	38,963	19,253	16,816	87.3%
42	Wholesale Trade	53,837	14,923	14,087	94.4%
44-45	Retail Trade	90,127	40,030	37,385	93.4%
48-49	Transport. & Warehousing	16,693	7,183	6,485	90.3%
51	Information	17,080	2,665	2,027	76.1%
52	Finance & Insurance	43,117	8,732	8,038	92.1%
53	Real Estate, Rental & Leasing	39,018	6,450	6,198	96.1%
54	Professional & Tech. Svcs.	103,500	9,919	8,606	86.8%
55	Mgmt of Co.s & Enterprises	3,703	2,786	2,359	84.7%
56	Administrative & Waste Svcs.	39,148	11,279	9,581	84.9%
611	Educational Services	9,235	3,515	3,160	89.9%
62	Health Care & Soc. Assistance	78,356	20,087	18,295	91.1%
71	Arts, Entertainment & Rec.	16,075	5,051	4,728	93.6%
72	Accommodation & Food Svcs.	60,566	57,213	55,977	97.8%
81	Other Services	412,936	9,183	8,803	95.9%
999	Nonclassifiable Establishments.	54,757	66	66	100.0%

J. Uncertainty in Cost Estimates

Inherent with any estimates are uncertainties associated with the underlying assumptions. Based on staff's experience and supported by most workshop participants, staff believes that the cost estimates represent the best estimate possible at this time given the available data. This section discusses some of the assumptions and the uncertainties that were not fully addressed in previous discussions.

1. Compliance Costs to Businesses

For the cost assessment of businesses, it is assumed that the overall system cost would all be passed onto the impacted businesses. The actual impact to businesses may differ due to several reasons, with the potential impact to a particular business varying widely for the same reasons. These reasons are detailed here.

a. Waste Reduction

It is generally recognized that solid waste reduction is a far more cost effective waste management strategy than recycling. Staff anticipates that through the implementation process of education and outreach for the proposed regulation, there also will be a general waste reduction impact. Solid waste reduction may be achieved through increased business efficiencies, greater reuse of materials, or less solid waste through more efficient packaging. When solid waste reduction is realized at the businesses, the individual businesses will experience a cost savings.

b. Economy of Scale

The potential economy of scale as more and more recycling is achieved cannot be captured adequately by the cost analyses. Staff anticipates that as more recycling occurs, the cost for recycling would decrease and potentially reduce the cost estimates from the analyses. On a local level, communities that go beyond their proportional share of the 5 $MMTCO_2e$ goal are most likely to build additional economies of scale into their systems and reduce recycling costs.

c. Local Pricing Policies

The overall solid waste management system will experience an increase in costs to implement (such as increases in costs due to an increase in quantities of recyclables to collect, transport and process at recycling facilities). However, it is unknown how or whether this increase will impact local pricing policies and, therefore, the businesses that must comply with the regulation. Since most existing franchise agreements provide financial incentives for businesses to recycle, as opposed to dispose of their solid waste materials, for the short term most businesses may experience a cost savings through recycling. However, as franchise agreements are renegotiated, the increased costs to provide recycling services will most likely be reflected in adjustments to the business rate structures to take this into account.

The following examples illustrate how existing pricing in two different types of systems, franchise hauler and open market, resulted in a business saving money through increased recycling.

In Sacramento County, commercial recycling is mandatory. For businesses, there is an open competitive market of service providers from which to choose. Each service provider has its own rates for trash and recycling. While Sacramento County does not set rates for trash and recycling, County staff was able to provide examples of the impacts of mandatory commercial recycling on local businesses. One example involves a local electrical contract company that, through recycling, reduced its solid waste from 8 cubic yards per week to 2 cubic yards per week. The company recycles 6 yards comprised of the following: paper, cans, plastics and cardboard. Implementation of the mandatory commercial recycling program resulted in the business saving $100 per

month or $1,200 annually. In another example, a framing company was able to reduce its garbage service by 75 percent through mandatory commercial recycling. The facility's bill was reduced $400 a month to $180 a month for a total annual savings of $2,640.

The City of Chula Vista utilizes an exclusive franchise hauler system whereby rates are set and no competition is allowed. Every customer who signs up for solid waste service is provided a combination of recycling and trash service that is designed to meet the needs of the business. Chula Vista utilizes Recycling Specialists who work with businesses to ensure they subscribe to the appropriate combination of solid waste and recycling service. The program's goals are to achieve the maximum solid waste diversion while meeting the needs of the individual businesses. The City asserts they can almost always design a solid waste and recycling service that will save the business money. Chula Vista has designed and utilizes a Recycle at Work brochure to assist businesses in educating their employees. Educating and changing behavior so that all the recyclables are placed in the recycling containers, not the trash, is the most difficult part of the successful program implementation. Chula Vista provided examples of businesses that through implementation of mandatory recycling were able to save money. Each of the smaller businesses saved money totaling approximately $100 per month or $1,200 annually.

Additional information on businesses realizing cost savings through increased recycling can be found on CalRecycle's WRAP home page at http://www.calrecycle.ca.gov/wrap/.

d. Local Pricing Policies – Costs to Households

Because of local pricing policies as discussed earlier and because impacted businesses may opt, if possible, to pass any added costs or savings on to their customers, the total cost of the regulation may be borne indirectly by all California households. If the total cost of the regulation in 2020 is equally divided by the number of households (13.1 million) in California, the cost per household would be about $0.2 to $0.3 per month at full implementation of the proposed regulation. However, on average, over the 2012 to 2020 timeframe, a savings of between $0.2 to $0.4 per month per household may be realized.

e. Potential Indirect Costs to Businesses

There may be some indirect costs to businesses to comply with the regulation. These costs were not captured by the analysis but are anticipated to be minimal. For a business that disposes 4 cubic yards or more of material and is subject to the requirement to recycle, depending upon how the recycling system is structured, there may be a relatively modest increase in handling the materials inside of a business to transport the materials to the collection bins. In some cases, businesses may require employees to place their recyclables in a different bin than the general solid waste materials. In that case, the increased time an employee may spend discarding solid waste materials is negligible. However, if a business chooses to employ a janitorial

service, and that janitorial service is required to segregate the materials that employees place in a single bin, the handling costs for those materials would increase over simply disposing of materials in one bin. However, this incremental cost increase is avoidable by designing the logistics of business recycling systems to minimize additional effort. CalRecycle and local jurisdictions also provide assistance to businesses in this regard. Examples of such resources are available at: http://www.calrecycle.ca.gov/LGCentral/Library/innovations/BizRecycle/

2. Implementation Costs to Jurisdictions

As mentioned previously in Section E, costs to jurisdictions were estimated based on survey data and used to calculate anticipated total costs for all impacted jurisdictions to implement the proposed regulation. These costs included providing program information on the web, printed materials for outreach to businesses, and direct contact/monitoring activities as required by the proposed regulation. Although an average cost was also calculated, the actual costs to a particular jurisdiction could vary. These costs are potentially on the high side because some of the survey data are from jurisdictions that have an enforcement component to their program. Because the proposed regulation does not require an enforcement component, the cost for enforcement would not be a result of implementing the proposed regulation.

Staff also received comments from Los Angeles County claiming its implementation costs would be much higher than average. In a letter from Los Angeles County Solid Waste Management Committee/Integrated Waste Management Task Force, they indicated "…that for the largest jurisdictions (over 1 million population), the annual cost of implementing a commercial recycling program that fully complies with the proposed regulations and includes comprehensive education, monitoring, and enforcement, could range from $2 million to $10 million or more when fully loaded labor rates are considered." These estimates were not supported with underlying cost data. Furthermore, the comments were based on an inaccurate assumption about enforcement of the proposed regulation by jurisdictions. CalRecycle staff met with the Task Force and has separately requested, but not received, the basis for these cost estimates, and specifically costs without enforcement activities included.

K. Potential Employment Impact

An estimate of the potential employment impact was made by staff using HF&H's cost model. It is anticipated that about 1500 to 1600 new full time equivalent recycling collection, support, supervisory, and management jobs in California may be generated as a result of the proposed regulation and its associated costs. This job estimate was for Scenarios 2.1 and 2.2 and based on full implementation in 2020. Table V-26 shows the quantity and type of jobs anticipated to be created for Scenarios 2, 2.1 and 2.2.

Table V-26. Comparison of Employment Impact

Category of Jobs Created	S2	S2.1	S2.2
Collection	969	848	797
Processing	851	714	660
Transportation	50	50	50
Total Jobs Created	1,870	1,612	1,507

Previous studies on the economic impact of recycling versus disposal have found significant positive effects in California. The additional benefits from recycling will not only generate additional jobs but would also result in additional goods and services.

L. Costs of Alternatives Considered

During the rule development process, two alternatives to the proposed regulation were considered: no action and adopt a voluntary measure. This section discusses the costs associated with each of the alternatives in turn. Table V-27 follows the discussion and summarizes the findings.

1. No Action

The no action alternative would impose zero additional cost. However, this alternative would also not achieve any additional recycling from the commercial sector and therefore would not be equally as effective as the proposed regulation.

2. Voluntary Measure

Adopting a voluntary measure would achieve limited additional recycling from the commercial sector. Currently, about 10% (about 46 out of 540) of the local jurisdictions have some type of commercial recycling programs. If a voluntary measure is developed, based on ARB and CalRecycle's experience with voluntary measures and the current status of commercial recycling programs without such a measure, staff estimates that reasonable that an additional 10% increase in recycling from the commercial sector may be anticipated. Therefore, this analysis was made assuming an additional 10 percent increase in recycling would be achieved under a voluntary measure. The cost for such a measure would be achieved without cost to the jurisdictions and assume to incur about 10 percent of what staff estimated as the systemwide of the proposed regulation (see Table V-16 for cost estimates). The resulting cost for a voluntary measure would be about $2.0 million to $4.2 million in 2020 and a savings of $41 million to $59 million (NPV: $37 to $51 million) over the 2012 to 2020 time period. While the cost per ton of CO_2e reduced in 2020 would be lower for the voluntary measure compared to the proposed regulation, the total amount of GHG reduced would be about 0.5 $MMTCO_2e$ at full implementation, significantly less than the

5 $MMTCO_2e$ goal for the category. Staff rejected this alternative since it would not achieve the GHG reduction goal.

Table V-27. Costs of Alternatives Considered Compared to Proposed Regulation

	Estimated Annual Cost in 2020	Estimated Cost Effectiveness
	(Million Dollars)	($/MTCO2e)
Proposed Regulation (Scenario 2.1 and Scenario 2.2)	$32 to $53	$6 to $11
Alternative 1 – No Action	0	0
Alternative 2 – Voluntary Measure	$2.0 to $4.2	$4 to $8

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VI. ENVIRONMENTAL ANALYSIS

A. Introduction

The proposed Commercial Recycling Regulation is a discretionary action by a public agency which has potential for resulting in direct or indirect changes to the environment, and therefore, is considered a "project" as defined by the California Environmental Quality Act (CEQA). ARB is the lead agency for the proposed regulation and has prepared this environmental analysis pursuant to its Certified Regulatory Program. California Public Resources Code §21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report or negative declaration once the Secretary of the Resources Agency has certified the regulatory program. ARB's regulatory program was certified by the Secretary of the Resources Agency on August 17, 1978 and is codified as California Code of Regulations (CCR), title 17, sections 60005-60008.

CEQA and ARB's regulations require that potential adverse environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid significant adverse environmental impacts of these projects be identified. To fulfill the purpose and intent of CEQA, ARB has prepared this environmental analysis to address the potential adverse environmental impacts associated with the proposed project. In accordance with ARB's certified regulatory program (title 13 CCR section 60005), for proposed regulations the environmental analysis is included in the Staff Report: Initial Statement of Reasons (ISOR) for the rulemaking.

Based on ARB's review of the proposed project, staff has concluded that pursuant to AB 32 (California Global Warming Solutions Act), the proposed regulation is needed to reduce GHG emissions associated with disposal of recyclable materials generated by businesses and from multifamily complexes in the waste management/recycling sector. The proposed regulation is projected to result in a reduction of 5 $MMTCO_2e$ at full implementation by 2020. Most of these reductions will occur outside California at locations using recycled materials to produce new products. Even though most of these GHG reductions occur outside of California, Californians will still benefit due to the primarily global nature of GHG emissions and their effect on climate change. GHG reductions from sources in California would be about 0.3 $MMTCO_2e$ by 2020.

The resource areas from the CEQA Guidelines environmental checklist (CCR, title 14, section 15000 *et seq*. Appendix G) were used as a framework for assessing potentially significant adverse impacts. Aided by the checklist, staff has concluded that the proposed project would not have a significant adverse effect on the environment. Therefore, no alternatives or mitigation measures are required to be included in this analysis. The analysis in this Chapter further supports the conclusion of no significant adverse environmental impacts.

If comments are received during the public review period that raises significant environmental issues, staff will summarize and respond to the comments. The written

responses will be included in the Final Statement of Reasons (FSOR) for the regulation. Prior to taking final action on the proposed regulation, the decision maker will approve the written responses (CCR 60007 (a)).

B. Analysis of Reasonably Foreseeable Environmental Impacts of Methods of Compliance

For this project, potential adverse impacts on the environment were considered in terms of the reasonably foreseeable methods of compliance in response to the proposed regulation. To comply with the proposed regulation, businesses, multifamily dwellings of 5 or more units, and public entities, that generate 4 cubic yards or more of commercial solid waste per week, will take one of the following actions:

- Separate recyclable materials from their solid waste stream and either self-haul, subscribe to a hauler, and/or allow the pickup of recyclables, so that the separated material is diverted from disposal to recycling/reuse/composting activities; or

- Subscribe to a recycling service that includes mixed waste processing as part of a system in combination with other programs, activities or processes that diverts recyclable materials from disposal and yields diversion results comparable to source separation.

The proposed regulation does not specify how much or what type of materials must be recycled, nor does it limit the types of materials that could be included in a recycling program. However, most businesses will likely select metals, paper, glass, plastics, and in some cases lumber, green waste and food waste – for recycling.

As discussed in earlier chapters, four different recycling scenarios were originally established by HF&H for the economic analysis and these scenarios were considered for the environmental analysis. Of these four scenarios, Scenario 2 (S2) was preliminarily selected as the most likely scenario. After considering key S2 assumptions, two were modified based on most reasonable businesses compliance strategies and Scenarios 2.1 and 2.2 were developed and served as staff's "best estimates" of likely scenarios. Therefore, the environmental analysis is based on S2.1 and 2.2. However, in order to ensure that the analysis was not underestimating the potential for adverse impacts, the analysis also considered S2 which was determined to be the upper limit for the analysis. This analysis is discussed below and additional supporting information is provided in Appendix H. Detailed descriptions of the regulatory requirements, description of the anticipated actions taken to comply with the proposed regulation, and a discussion of emissions impacts are provided in Chapter IV and V.

The system wide changes expected under S2.1 and S2.2 are similar to those for S2. The main potential for differences is in the potential for increases in transportation-related emissions associated with additional recycling as discussed

below under ‘Transportation Emissions.’ A more detailed discussion of S2.1 and S2.2 is provided in Chapters IV and V of this report.

Implementation of the proposed regulation will not require any significant changes to the existing solid waste infrastructure in California. Staff finds that, no new facilities will need to be constructed, no existing facilities will need to be expanded beyond their current capacity, and no significant changes in the operation of existing facilities are likely to occur as a result of the proposed regulation.

Existing recycled material handling facilities are operating below capacity and the projected increase in material due to increased recycling projected from the proposed regulation will not exceed the current capacity. Thus, no new facility or expansion of existing facilities will be needed to handle the 1.7 million tons of recyclables anticipated by 2020. The waste handling fleet also has excess capacity. An increase in the solid waste collection fleet, containers, and personnel will not be needed during the initial years due to current and projected excess capacity and the projected low volume of recyclables collected initially. The need for additional vehicles, containers, and personnel will increase about 1 to 2 percent per year in the 2014 – 2020 time period. However, these increases will not require any new facilities to be built or existing facilities to be modified. The proposed regulation will change the drop off point of the material, which may increase, or decrease travel distance. Instead of material being taken to a landfill, a portion of the fleet will be diverted to take material to recycling handling facilities and to transport materials from the recycling handling facility to the recycled material processing facility or the recycled material transport facility. These capacity and travel projections are discussed in detail in Appendix H.

Since the proposed regulation will not require any new facilities to be built or expanded, ARB staff finds that there will be no reasonably foreseeable environmental impacts on aesthetics, land-use/planning, population and housing, transportation, agricultural and forestry resources, cultural resources, mineral resources, public services, utility and service systems, geology and soils, hydrology and water quality, or recreation.

Staff analyzed two compliance approaches that could have potentially resulted in environmental impacts if these approaches were to become major compliance pathways. These two compliance approaches are composting and remanufacturing of recycled material at California facilities. Staff concluded that significant market development and infrastructure development would be needed before such approaches could redirect a significant volume of recyclable material. Therefore, as discussed below, the staff does not believe that either compliance pathway will result in significant adverse environmental impacts.

The additional share of commercial solid waste going to composting due to the proposed regulation is estimated to be minimal. Based on current understanding of composting infrastructure and cost, under S2.1 and S2.2, staff’s analysis anticipates that there would not be any significant change in composting and that the existing infrastructure has excess capacity to absorb minor volume increases. As such, we do

not foresee adverse environmental impact associated with this level of composting activity estimated under S2.1 or S2.2. For completeness, however, further discussion of potential environmental impacts from composting is included later in this chapter.

Under S2.1 and S2.2, staff estimates that about 7 percent of the anticipated recycled commercial material will be remanufactured in California. This is the basis for determining that about 5 percent of the GHG reductions are likely to occur in California. (See Chapter IV for detailed discussion of emissions calculations.) Additional California-based remanufacturing of recycled materials offer a number of advantages including increased job opportunities, additional production, and security of the market. However, the proposed regulation, by itself, is unlikely to result in any significant increase in the amount of remanufacturing from recycled materials occurring in California. As with composting, significant market, infrastructure, and product development would be needed to be undertaken to increase California-based remanufacturing of recycled material. A variety of education and incentive programs will be needed if this is to happen. Since the proposed regulation does not and cannot provide such incentives, staff finds that the proposed regulation will not significantly change the amount of recycling manufacturing in California, and therefore will not have any adverse environmental impacts. However, by ensuring a steady nominally increased supply of recyclable material, the proposed regulation will be critical if recycling manufacturing is to expand in California.

1. Air Quality

Overall, air quality benefits will result from recycling an additional 1.7 million tons of materials per year by the year 2020 beyond that currently being disposed in landfills. This includes reductions in GHG emissions and co-benefit reduction of criteria air pollutants and TACs associated with an increased use of recycled materials. However, much of the GHG and co-pollutant benefits will occur outside California at locations where the recycled material is used to produce new products. Even though most these reductions occur outside of California, Californians will still benefit due to the primarily global nature of GHG emissions and their effect on climate change.

Below is a discussion of the potential increases and decreases in air emissions within California due to the proposed regulation.

a. Decrease in Greenhouse Gas Emissions

Within California, the proposed regulation will reduce GHG emissions from commercial waste disposal by about 5 $MMTCO_2e$ mainly due to energy saved from using recycled materials instead of raw materials to produce new products. The proposed regulation reduces GHG emissions by reducing energy use associated with the extraction or harvest of raw materials and by replacing raw materials with recyclables, thereby reducing fossil fuel demands in manufacturing. For example, using recycled aluminum in place of virgin materials eliminates converting bauxite into alumina, which is an energy intensive process. Recycled PET resin reduces the amount of methanol, acetic

acid, olefins, and naphtha needed in the manufacturing process. Steel made with recycled inputs removes coke manufacturing from the overall process, greatly reducing the GHG emissions. Recycled cardboard, office paper and newspaper reduces the amount of trees that are harvested from forests, thereby reducing emissions associated with harvesting trees and retaining forests and their carbon storage benefits. It is anticipated that the proposed regulation will result in a reduction of 5 $MMTCO_2e$ at full implementation by 2020. Most of these reductions will occur outside California at locations using recycled materials to produce new products. Based on the mix of materials recycled for Scenarios 2.1 and 2.2, GHG reductions in California would be approximately 0.3 $MMTCO_2e$ by 2020. See Chapter IV for more details.

Although not counted toward the 5 $MMTCO_2e$ goal of the proposed regulation at full implementation, a benefit from the regulation is the GHG reductions that would result from the diversion of organics from landfills. A discussion of this benefit is discussed below.

b. Decrease in Methane and VOC Due to Reduction in Landfill Gas Generation

Any reduction of organic material disposed of at landfills as a result of the proposed regulation would result in a corresponding decrease of both methane and VOC emissions from landfills over time. Therefore, a co-benefit of the proposed regulation is the potential emission reductions through diversion of organic material from landfills. The methane and VOC emission benefits from reducing organic material going to landfills is mainly from potential reductions in methane generation. The quantity of methane and VOC benefits from the tonnages diverted from landfills would vary depending on the material types (green waste, food waste, wood, paper) that are diverted. It is calculated that the potential benefits are about 14,900 tons per year (tons/yr) of methane or an additional 0.28 $MMTCO_2e$ and 100 tons/yr of VOC under S2.1 and S2.2 due to the reduction of wood-based organics from landfills in California. See Chapter IV and the remainder of Chapter V for a detailed discussion of the calculated benefits.

2. VOC Emissions from Composting and Anaerobic Digestion

Staff analyzed the potential for increased VOC emissions resulting from a possible increase in composting and anaerobic digestion for treatment of green and food waste at locations where materials are processed. As discussed below, staff concluded that the potential for adverse VOC emissions would be insignificant because the expected increase in composting and anaerobic digestion are not anticipated to be large and any potential associated increases in VOCs would be addressed under existing air district rules.

At the same time, use of composted material can provide GHG and criteria pollutant benefits by improving soil quality, increasing soil carbon sequestration, and improving water quality and water conservation. Anaerobic digestion is beneficial because it is a

source of renewable energy. The following discusses the potential for VOC emissions for these two technologies.

a. Composting

The dominant form of composting in California is windrowing. Windrow composting is the production of compost by grinding and mixing organic materials and piling these in long, narrow rows which are turned with a specially designed machine. VOC emissions result from the natural degradation of the organic materials in the compost pile.

Under Scenarios 2.1 and 2.2, there will be minimal additional composting as a result of the proposed regulation. These are the most likely scenarios because composting infrastructure for food waste is currently not readily available. Also, most yard waste and paper is used as mulch, boiler fuel, and alternative daily cover. Therefore, it is anticipated that any potential increase in VOC emissions associated with composting as a result of the proposed regulation will be insignificant.

For a worst case assessment of potential VOC emissions of composting, staff used HF&H's unlikely Scenario 4 where 2.1 million tons of the additional 3 million tons to be recycled by 2020 are compostable, with about half of that being green waste. Although the range of measured emissions is quite broad, analysis of the measured emissions rates coupled with the types of facilities operating in California indicates a most probable emissions factor range of 4 to 7 pounds of VOC per ton of wet feedstock for green waste. Since approximately 41 percent of the material accepted by composters and processors is composted, composting of green waste (mainly yard waste) and compostable paper is estimated to result in an additional 2 to 4 tons of VOC emissions per day (CalRecycle, 2010a). Although this scenario is not the anticipated outcome of the proposed regulation, it is anticipated that any significant increases in VOC emissions would be addressed and fully mitigated by the local air districts under existing (see Chapter II, page II-8) or new rules.

Additionally, CalRecycle and ARB will begin a major effort later this year to assess opportunities and challenges to significantly increase GHG reductions through composting and anaerobic digestion of organic wastes. This work will provide an opportunity for further analysis on the potential environmental impacts of increased composting well in advance of full implementation of the proposed regulation. Preliminary information suggests that potential VOC emissions from composting could be significantly reduced by using engineered control systems or best management practices, such as compost cover blankets. For example, using finished compost cover blankets on windrow piles can reduce VOC emissions by 82 percent for the first week and by 75 percent for the first two weeks. Controlling emissions for the first two weeks is important because approximately 80 percent of VOC emissions from green waste and 70 percent of VOC emissions from food waste are emitted in this timeframe (CIWMB, 2008).

A recent peer-reviewed manuscript by Kumar, et al. (2011) indicates that VOC emissions from green waste composting are less likely to lead to ozone formation than VOCs from gasoline-powered light duty vehicles. While the paper by Kumar, et al. (2011) shows that ozone formation (under laboratory conditions) may be less than passenger vehicles, there is still a measurable ozone formation from green waste compost VOC emissions. Staff is evaluating this manuscript and others in regards to the validity of the reactive organic gases (ROG): total organic gases (TOG) ratio used as a proxy for ozone formation. This regulation, which is related to GHGs, is not the proper forum to address concerns related to ROG:TOG ratios. This issue will also be examined in the work that ARB and CalRecycle will be doing when they evaluate greater utilization of composting and digestion to provide further GHG reductions from the solid waste sector.

Food waste composting has been studied less than green waste, with available data suggesting a wider emissions range and the potential for higher emissions when process controls are not state-of-the art. Currently, food waste composting in California is limited to facilities with high levels of control due to local permitting requirements. Facilities that compost food waste typically use forced aeration and bio-filters to clean process air, though some facilities will blend small amounts of food into open windrows.

Aeration systems are becoming more sophisticated and effective, and will become more commonplace in the future as local air quality management authorities increase their regulation of compost facilities. Further, VOC emissions can be significantly reduced by using aerated static piles with biofilters, applying a compost cover to active windrows, or using a cover system. An emission factor of 0.24 lb VOC per ton of wet feedstock was estimated for aerated static pile composting of a mix of biosolids, green waste, and wood waste at the South Kern Industrial Center. This facility's biofilters are estimated to remove 85 percent of VOCs. The Gore Cover system has been shown to result in more than 90 percent control of fugitive emissions from compost operations for biosolids/wood chip, biosolids/green waste, and green waste mixtures when compared to windrow composting of green waste (Schmidt, 2009).

b. Anaerobic Digestion

Staff examined the possibility that the proposed regulation may result in an increase of the use of other technologies for treating green and food waste such as anaerobic digestion. Staff concluded that the possibility of a significant increase in anaerobic digestion as a result of the proposed regulation is unlikely because there is limited processing of green and food waste using anaerobic digestion at this time and a significant investment in an infrastructure would be needed if levels of anaerobic digestion were to increase significantly. Green and food waste that is available for composting would also be available for anaerobic digestion. If anaerobic digestion is used instead of windrow composting, a significant reduction in VOC emissions can be realized at these types of facilities through biofiltration and/or combustion in flares or engines. In-vessel anaerobic digestion systems have demonstrated VOC control efficiencies of 80 percent or more. (SJVUAPCD, 2010). This is fairly conservative.

VOCs can be reduced by 99% or more if waste is not stored on-site but placed directly in-vessel and digester gases are collected and either flared or incinerated in a generator.

3. Potential Decrease in Toxics Air Emissions from Landfills

Landfill gas typically consists of roughly 50 percent methane and 50 percent CO_2, with trace levels of non-methane organic compounds (NMOCs). NMOCs represent less than 1 percent of landfill gas and include VOCs, TACs, and odorous compounds. NMOC may be incorporated into the landfill gas through vaporization, chemical reaction, and biological decomposition. Vaporization is affected by the concentration of compounds in the landfill, the physical properties of the individual organic constituents, and the landfill conditions (ARB, 2009).

A potential co-benefit of the proposed regulation is the reduction of material going to landfills and contributing to landfill gas formation. The small quantities of TACs that may be present in landfill gas can include: benzene, ethyl benzene, toluene, vinyl chloride, dichloroethylene, 1,2, dichloroethylene, and tetrachloroethylene (CIWMB, 1988). Contamination of waste going to landfills with prohibited materials is one of the key sources of TAC emissions. Since TAC emissions from landfill gases and composting processes are small, it is anticipated that the potential impact of TAC emissions due to the proposed measure will be small as well.

4. Transportation Emissions

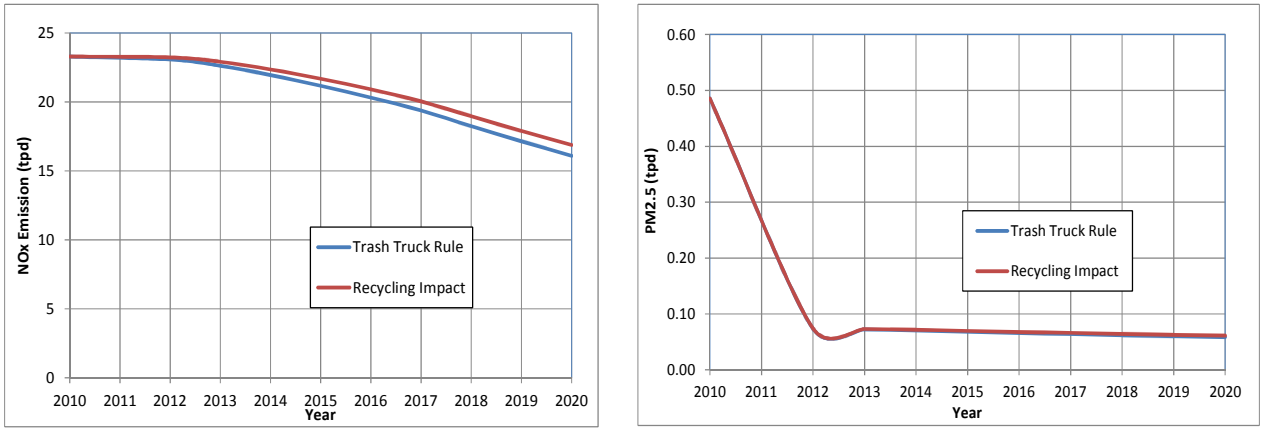
Overall, emissions from heavy duty diesel trucks (HDDT) and medium duty diesel trucks (MDT) are projected to decline in California in future years due to the implementation of other ARB regulations (see Chapter II for detailed description) that require improvements in truck engines to reduce emissions. Any potential increase in emissions resulting from the proposed Commercial Recycling Regulation would be the result of an increase in vehicle miles traveled (VMT) associated with recycling activities. It is difficult to predict how implementation will impact VMT because of the considerable uncertainties in predicting how the affected industry will respond to the regulation. There could be an increase, decrease, or possibly no change in associated VMT. As discussed in more detail below, under the most likely scenario, staff believes that a variety of factors will result in no increase or even a decrease in VMT resulting from implementing the proposed regulation, and therefore, no significant adverse emission impact due to the proposed regulation.

However, in order to ensure that staff did not underestimate the potential for emissions impacts, staff analyzed a conservative “worst case” scenario assuming an increase in associated VMT. Staff found that if there were increases in VMT, these increases in emissions will be due to increases in VMT to transport the additional recycled material to different locations. Any increase in VMT emissions due to recycling activities would be well distributed geographically. Under this conservative scenario, staff estimated a potential statewide increase of 0.003 tons per day (tpd) or 6 pounds per day of diesel

PM, 0.8 tons per day of NO_x, and 150 tpd of CO_2 in 2020. The detailed methodology and assumptions for estimating the increased VMT and associated emissions impacts can be found in Appendix H.

Figure VI-1 graphically depicts the potential change in future emissions from waste collection vehicles due to increased VMTs under the conservative assumption scenario. From an air quality and public health perspective, overall emissions from waste collection vehicles will continue to decline in future years due to implementation of stricter requirements on diesel truck engines. However, under this scenario, emissions would not decline as rapidly as without the proposed regulation by approximately less than 5 percent for PM2.5, NOx, and CO_2. The potential for a small decrease in future emissions benefits under the conservative scenario is not considered a potentially significant adverse environmental impact because overall emissions are declining and there are no increased emissions from current conditions.

Figure VI-1: Potential Impact of Proposed Regulation on Statewide NOx and PM2.5 Emissions



There are uncertainties associated with this estimate and it is difficult to predict if VMT overall will increase or decrease just due to additional recycling activities. The data available allows us to estimate potential transportation-related VMT changes but the data is not sufficient for us to fully account for reductions in emissions from self-haul activities such as back-haul and private-haul. For example, back-haul uses the same trucks that delivered material to pick up the recyclables and would eliminate the extra truck trip for recyclable collection. However, the data available on back-haul is not sufficient for us to assume that commercial-haul services at locations employing back-haul will have lower VMTs. While there will be a decrease in the amount of material needing commercial-haul, it is difficult to estimate the VMT change. To be conservative, the VMT assessed and the emissions calculated represent the case where the commercial-hauler will drive the same route and in effect have little change on overall VMT when the commercial-hauler can factor in back-haul locations into its scheduling and decrease VMT, thereby improving collection efficiency.

However, due to the increase in self-haul, it is reasonable to assume that there will be less stop and go for the commercial-hauler. This would increase the efficiency of the vehicle and thereby result in lower overall emissions from the commercial vehicles transporting recyclables. This increase in efficiency is substantial but is not accounted for in the emissions calculation; therefore, the emissions calculated for S2 and discussed earlier is an upper limit assessment of potential emissions. In addition, because of the enhanced education and outreach effort by the local jurisdictions due to the proposed regulation, it is possible that businesses will take additional actions outside the scope of this regulation, for example, decreasing packaging and increasing the reuse of products. Taking these types of actions could result in less waste generated and therefore fewer trips taken to landfills, which would result in an overall decrease in VMT required and lowered emissions estimates. However, since these types of actions are outside the scope of this regulation, this compliance strategy has not been factored in the VMT calculation.

We have a similar data gap for owner self-haul and private-haul. A factor in reducing emissions from self-haul and private-haul that we cannot account for is that many of the vehicles engaged in these activities will be gasoline-fueled and have no diesel PM emissions and much lower NO_x emissions than diesel-fueled vehicles. Logic suggests that back-haul and self-haul could partially mitigate some of the estimated increase in emissions due to the proposed regulation. However, we do not have empirical data to estimate how much mitigation self-haul will provide.

In addition, VMT could also decrease for other reasons such as improved efficiency in the system needed for the expanded network, provider consolidation, outreach and communication local jurisdictions may do as a result of the proposed regulation, reduced packaging, and changes in buying and disposal habits of businesses and the public.

As mentioned earlier, the estimated CO_2 emissions increase from potential increased transportation emissions is estimated to be 150 tpd in 2020. This is equivalent to about 0.04 MMTCO2e. This marginal increase in transportation-related GHGs in California will be fully offset by the proposed regulation in California alone, since it is expected to reduce GHGs by 0.3 MMTCO2e in California when fully implemented in 2020. This increase will be further offset from the 5 MMTCO2e GHG emissions reductions expected as a result of this regulation. Even though most these GHG reductions occur outside of California, Californians will still benefit from the proposed regulation GHG reductions due to the primarily global nature of GHG emissions and their effect on climate change. Therefore, the proposed regulation would not result in any GHG increase that would require mitigation.

5. Noise

On a statewide basis, implementation of the proposed regulation is not expected to result in generation of noise levels in excess of current levels. A minimal increase in temporary or periodic noise levels is expected locally as a result of increased vehicle

trips to recycling facilities. The additional processing of solid waste and recyclable materials at these facilities may result in localized periodic increases in noise levels. However, there may also be a slight decrease in noise to and around landfills since traffic will be diverted to recycling facilities. Staff finds that the impact on noise levels due to the proposed regulation will be insignificant. Further, local noise ordinances set maximum noise thresholds at facility boundaries and sensitive receptor property boundaries.

6. Odors

Processing of organic materials could potentially produce substantial odors. The occurrence and severity of odor impacts depend on many factors, including type of operation, feedstock type, odor controls implemented, distance between source and receptors, and sensitivity of receptors. Implementation of this regulation is expected to result in some amount of odorous materials being diverted from landfills, with a subsequent reduction in odorous emissions from these facilities. However, this material is expected to result in a similar increase in odoriferous emissions at compost and anaerobic digestion facilities. Compost facilities (including a facility conducting anaerobic digestion) are required to develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Also, new or modified facilities are required to comply with appropriate local land use plans, policies, and regulations.

7. Traffic

For the analysis of potential impacts on traffic and transportation staff looked at the potential for increases in vehicle miles traveled (VMT) associated with recycling activities. For purposes of estimating additional vehicle miles traveled (VMT), the analysis took a conservative approach and used Scenario 2 data from the HF&H study and shown in Appendix H. As discussed in Chapter V, because of the assumptions of increased self-hauls for Scenarios 2.1 and 2.2, the use of Scenario 2 data represent conservative upper range estimates for the likely Scenarios 2.1 and 2.2. These are the same conservative assumptions staff used in estimated potential transportation emission impacts.

Based on the Scenario 2 data, statewide implementation of the proposed regulation may result in a small increase in waste collection vehicles' VMT. Staff estimates there is the potential for an additional 10.3 million VMT per year or 40,000 miles per day and an additional 680,000 one-way vehicle trips per year or 2,600 trips per day in 2020. The potential increase due to the proposed regulation is less than one tenth of one percent (0.10 percent) of the statewide 2020 VMT (ARB 2010a).[1] Thus, implementation of the proposed regulation would not cause an increase in VMT that is substantial in relation to existing traffic loads and street systems or exceed the level of service standards established by county congestion management agencies for designated roads or

[1] The 2020 statewide estimate of VMT for heavy duty diesel trucks (HDDT), medium duty trucks (MDT), and non-transit buses is about 60,000,000 miles per day. Waste collection vehicles are categorized as HDDT.

highways. Additionally, this slight VMT increase is not expected to have a significant impact on the existing transportation infrastructure. At a regional, county, and local level, implementation of the proposed regulation is expected to result in minor increases to traffic load and level of service at a local level (average of an additional 4-5 vehicle trips per day per facility). The existing transportation infrastructure is expected to be sufficient to accommodate the additional volume of materials that will need to be processed and delivered to markets as a result of implementation of the Commercial Recycling Regulation. The conclusion of insignificant impact on roadways is reasonable considering the minimal increase in average annual daily traffic volumes that are expected to result (less than one tenth of one 1 percent). The level of impact is discussed in more detail under "Transportation Emissions" above. For additional details, see Appendix H.

C. Mitigation Measures and Alternatives

Because there are no identified significant adverse environmental impacts resulting from implementation of the proposed regulation and ARB assumes compliance with other regulations and requirements discussed earlier, no alternatives or mitigation measures are required to be included in this analysis. Because of uncertainty about potential emissions associated with the potential for increases in VMTs, ARB has committed to monitor VMT changes to ensure that any foregone benefits in emissions decreases are not realized. Below we discuss the approach we plan to use to track waste collection vehicle VMT changes and two approaches we can use to address any decrease in emissions benefits.

With implementation of the proposed regulation, we will have an ability to estimate VMT changes for waste collection vehicles based on the monitoring, recordkeeping, and reporting provisions in the Waste Collection Vehicle Regulation. Using this information and emission inventory models, we can determine if the emissions from waste collection vehicles are increasing due to the proposed regulation. In the event we find that there is any significant increase in emissions in future years, ARB staff has identified two strategies that will address any potential increase in VMT and the resultant emissions from waste collection vehicles. These include addressing any emissions increase in upcoming revisions to the State Implementation Plans for PM2.5 and Ozone and new reductions that will result from recently approved federal standards for HDDT. These are described below.

1. State Implementation Plans

ARB has one of the most dynamic and comprehensive air quality management programs in the world. At its core, it relies on an adaptive management approach to ensure public health and air quality is protected. On-going efforts collect information on emissions and activity data from all sources, monitors throughout the State collect real-time data on ambient air quality, and there is close coordination with the local air pollution control districts and U.S. EPA to ensure that emission reduction strategies are adopted and implemented to make continued progress towards meeting federal and

State ambient air quality standards. These standards represent the allowable atmospheric concentrations of pollutants at which the public health and welfare are protected. They also include a reasonable margin of safety to protect the more sensitive individuals in the population.

Under the federal Clean Air Act, ARB is required to develop State Implementation Plans that identify how the State will meet the federal ambient air quality standards for ozone and PM2.5. These plans are periodically updated to ensure they reflect the most accurate current and projected emissions inventory, scientifically sound air dispersion models, take advantage of new and emerging technologies, and have identified all measures necessary to meet the ambient air quality standards. The planning process is underway now to prepare a SIP for the 24 hour PM2.5 standard by the end of 2012 and for ozone in the 2015 timeframe. As part of this effort, any future potential emission increases associated with an increase in VMT from waste collection vehicles will be accounted for in the inventories prepared for these attainment demonstrate plans, and reflected in the control strategies developed to bring nonattainment areas into attainment with federal air quality standards.

2. Federal Heavy Duty Truck Regulations

The federal government recently established fuel economy standards for heavy vehicles such as on-road heavy duty trucks, garbage trucks and buses. (http://www.epa.gov/otaq/climate/regulations.htm#1-2)
The standards were developed by the U.S Department of Transportation and the U.S. Environmental Protection Agency and require garbage trucks to meet a 10 percent reduction in fuel consumption for model year 2014-2018 vehicles. While the regulation targets the reduction of greenhouse gas emissions, an improvement in fuel efficiency will also reduce emissions of criteria pollutants such as NOx. These reductions will occur in the post 2014 timeframe and will help to mitigate any potential increase in emissions from waste collection vehicles that may result from implementation of the proposed regulation.

D. Community Health and Environmental Justice

1. Potential Health Impacts

Potential emissions and emissions reductions due to an increase in commercial recycling have been discussed in detail in Chapter V. The benefits of the proposed regulation include an overall reduction in GHG emissions, criteria pollutant, and TAC emissions and associated health benefits at the locations that reuse recycled material. These locations are primarily outside California. Within California, the proposed regulation will potentially provide a modest GHG emission reduction mainly due to avoided emissions at landfills, diversion of wood waste from landfills to power generating facilities, and energy saving associated with increased use of compost. As discussed earlier, under the worst case scenario there is a possibility that the VMT associated with the collection and transport of recyclables could increase. Although an

increase in VMT could result in a small increase in NOx and diesel PM emissions from waste collection vehicles, overall emissions from trucks will continue to decline into the future. The potential for increased VMTs would, however, lead to a slower decline in overall statewide emissions than without the regulation. Due to the overall emissions reductions expected in future years, there are no adverse health impacts associated with the proposed regulation. In terms of VOC emissions, because the best estimate scenarios, Scenarios 2.1 and 2.2, anticipates minimal increases in composting, the potential increase in VOC emissions will be negligible. Further, composting facilities will have to comply with local zoning and air permitting requirements. Therefore, any increase in composting due to the proposed regulation would be insignificant and therefore is not anticipated to create an adverse impact on community health.

The regulation is anticipated to have positive GHG benefits. The proposed regulation will reduce GHG emissions and therefore lessen global warming and the associated detrimental health impacts. While the primary location of GHG reductions due to the proposed regulation will be outside California, the benefits of the reductions are important since climate change is a global issue and actions that California takes to reduce GHG emissions within or outside California are equally important. Scientists predict that if the increase in GHG emissions continues unabated, temperatures will rise by as much as 10 degrees Fahrenheit by the end of this century. It is impossible to predict exactly how global warming will affect California's ecosystems and economy in the future. However, the expected physical changes will continue to impact California's public health, economy and ecology.

These impacts include the exacerbation of air quality problems, a reduction in the supply and quality of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems, and an increase in infectious diseases, asthma and other human health-related problems. Continued global warming and climate change will have detrimental effects on California’s largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry.

2. Environmental Justice

Environmental justice (EJ) is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. ARB is committed to integrating EJ into all of our activities. On December 13, 2001, the Board approved “Policies and Actions for Environmental Justice,” which formally established a framework for integration of EJ into ARB’s programs, consistent with the directive of California state law. These policies apply to all communities in California, however, EJ issues have been raised specifically in the context of low-income areas and ethnically diverse communities (ARB, 2001). Further, AB 32 as outlined in HSC section 38562(2), also states that GHG regulations should not disproportionally impact low-income communities.

Our EJ policies are intended to promote the fair treatment of all Californians and cover the full spectrum of ARB's activities. Underlying these policies is recognition that the agency needs to engage community members in a meaningful way as it carries out its activities. ARB recognizes its obligation to work closely with all communities, environmental organizations, industry, business owners, other agencies, and all other interested parties to successfully implement these policies.

The proposed regulation is consistent with our EJ policy to reduce health risk in all communities, including those with low-income and ethnically diverse populations, regardless of location. Potential risks from climate change due to GHGs can affect both urban and rural communities. Therefore, reducing emissions of GHGs through implementing a commercial recycling program will provide benefits to both urban and rural communities in the State, including low-income and ethnically diverse communities.

As discussed above, it is difficult to predict how implementation will impact VMT because of the considerable uncertainties in predicting how the affected industry will respond to the regulation. There could be an increase, decrease, or possibly no change in associated VMT. Staff believes that a variety of factors will result in no increase or even a decrease in VMT and in communities from implementing the proposed regulation. The factors are discussed in more detail under "Transportation Emissions" above. However, in order to ensure that staff did not underestimate the potential for emissions impacts, staff analyzed a conservative "worst case" scenario assuming an increase in associated VMT at the community level. An analysis was conducted to estimate the potential traffic increases and localized impacts in five neighborhoods due to an increase or shifting of traffic volumes to waste recycling facilities and potentially to composting facilities.

Five neighborhoods were identified and are intended to represent several regions of California. These neighborhoods are: Wilmington, Pacoima, West Oakland, Barrio Logan, and a location close to Arvin (in the Fresno area). It was found that no waste recycling facilities or composting facilities are located in Barrio Logan; therefore, no case study was performed for that neighborhood. There is one material recycling facility each in Wilmington, Pacoima, and West Oakland and these facilities were used in the analysis. For the Arvin neighborhood, no material recycling facility is located in this area. Although there is a composting facility close to Arvin, it was not used in the analysis because the most likely scenario assumes minimal increase in composting. Therefore, a large material recycling facility close to Arvin was chosen for the analysis.

Based on the results of the transportation/traffic analysis detailed earlier, the potential additional trips to the identified material recycling facilities due to the proposed regulation was calculated by multiplying the total additional number of trips for the region (shown in Appendix H) by the ratio of the material recycling facility's capacity to the total capacity of the region. For the facilities in Wilmington and West Oakland, it was estimated that a maximum of one additional trip every two days to the facilities may result from the proposed regulation in 2020. For the facility in Pacoima, it was

calculated that two additional trips per day may result from the proposed regulation at full implementation in 2020. Lastly, for the large transfer station in Fresno, it was calculated that 10 additional trips per day may result from the proposed regulation in 2020. It is important to note that there will be a decrease in traffic to landfills as a result of this regulation. Staff concluded that the reduced landfill trips offset some of the increased traffic to these recycling facilities.

The potential increase in emissions of criteria pollutants due to the increased traffic in these neighborhoods was also analyzed based on the associated mileage of the additional trips estimated. For the transfer station in Fresno, with the potential worst case impact due to 10 additional trips per day, an additional 96 VMT per day was estimated for the immediate neighborhood near the transfer station. Based on the emissions information detailed on Table VI-1, we estimated a potential increase in NO_x of 2 pounds per day and the potential increase in PM2.5 of 0.01 pounds per day by 2020. Using the health impact assessment data developed by ARB as part of the Diesel Particulate Matter Control Measure for On-road Heavy-duty Diesel-fueled Residential and Commercial Solid Waste Collection Vehicles rulemaking, the potential cancer risk from diesel PM associated with these emissions would be insignificant (well below 1 chance in a million). This increase will be further reduced in the future by ARB diesel regulations and new diesel engine standards that phase in over time. (ARB, 2010b)

The result of the analysis showed an insignificant potential increase in traffic around the neighborhoods and no anticipated adverse public health impacts. In addition, these impacts will be offset somewhat by the decrease in traffic patterns around landfills due to the increased diversion of solid waste. Thus, staff finds that there will be no significant adverse traffic or emissions impacts due to implementation of the proposed regulation. However, staff will monitor VMT changes during implementation of the proposed regulation and take action to ensure that there is no net increase in emissions in California associated with the proposed regulation.

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VII. PUBLIC OUTREACH AND IMPLEMENTATION

A. Background

In complex rulemaking, the Administrative Procedures Act (Government Code section 11340 *et seq.*) requires State agencies to involve potentially regulated parties before publishing its notice of proposed rulemaking. In keeping with the longstanding tradition at CalRecycle and ARB, staff has made extensive efforts to provide opportunities for participation in the rulemaking process. Staff's public outreach efforts included extensive meetings with stakeholders through workshops and Strategic Policy Development Committee meetings. The informal rulemaking phase also included CalRecycle staff taking advantage of the opportunity to discuss the regulation at various meetings and other speaking engagements. The groups engaged in informal dialogue with CalRecycle staff which included representatives from the solid waste industry, local governments, hauler/service providers, recycling businesses, general businesses, environmental organizations, and other interested parties.

Staff has provided numerous opportunities for stakeholder participation in the rulemaking process. Staff's public outreach efforts included eight public workshops, speaking at a variety of conferences, participating in various local government meetings, participating in informal meetings, teleconferences, and phone calls with interested stakeholders. Staff also created and maintained a website and email listserv to automatically update interested parties about rulemaking developments. More detailed discussion of staff's outreach efforts is contained herein.

B. Informal Rulemaking Phase

Staff initially coordinated with representatives from local government, solid waste and materials management industry, environmental groups, and interested members of the public to discuss regulatory concepts in March 2009.

Based on independent research and the above coordination, staff prepared a mandatory commercial recycling White Paper for use at stakeholder workshops to provide a basis for discussion at informal stakeholder meetings. The White Paper summarized related past and pending legislation, highlighted components of a number of existing ordinances, and outlined potential policy issues. The workshop notice was sent to a broad list of interested parties and the White Paper was posted on CalRecycle's newly developed web pages (http://www.calrecycle.ca.gov/climate/Recycling/default.htm), created and maintained with information on Mandatory Commercial Recycling as well as links to other related resources.

The initial stakeholder workshops were held on July 20, 2009, in Sacramento and in Diamond Bar on August 6, 2009, the former also being webcasted. Notification of these workshops was distributed in various ways, including:

- CalRecycle and ARB listservs, including interested parties, local government, climate change, and Recycling Market Development Zones;
- Posting on the CalRecycle website;
- CalRecycle (formerly CIWMB) web-site; and
- Coordination with affected groups such as the California Chamber of Commerce, League of California Cities, California State Association of Counties, Regional Council of Rural Counties, Solid Waste Association of North America, California Resources Recovery Association, Californians Against Waste, and the California Association of Recycling Market Development Zones.

Both workshops were well attended, with nearly 50 participants in Sacramento, plus those interacting via webcast, and over 100 attendees in Diamond Bar. Attendees included representatives from local government, haulers/service providers, businesses, consulting firms, and various associations and organizations.

At the September 9, 2009, CIWMB Strategic Policy Development Committee meeting, staff provided an update on the status of developing the regulation to implement the commercial recycling measure. The CIWMB concurred with staff's proposed conceptual provisions to achieve sufficient commercial recycling statewide to result in at least 5 $MMTCO_2e$ reductions. Staff was directed to use the draft conceptual regulatory provisions as the basis for drafting regulatory language to be presented and discussed at the Strategic Policy Development Committee meeting in December 2009.

On December 9, 2009, at the final Strategic Policy Development Committee meeting, prior to becoming the newly formed CalRecycle, staff provided an update on the status of the regulation to implement the commercial recycling measure. Staff reviewed draft regulatory language and a work plan outlining the steps to complete the development and adoption of the regulation. Staff's work plan included the provisions to obtain feedback from stakeholders prior to and during the rulemaking process. The CIWMB concurred with staff's regulatory development work plan and draft regulatory language.

CalRecycle hosted another Informal Stakeholder Feedback Workshop on the draft regulatory language at the CalRecycle Materials Management and Local Assistance Program monthly public workshop on June 16, 2010. Workshop topics included general project background information, an overview of the revised draft regulation, discussion of related issues, presentation of associated tools, next steps, and a timeline for formal rulemaking.

In coordination with ARB, CalRecycle held follow-up stakeholder workshop on the proposed Commercial Recycling Regulation on September 21, 2010. The focus of this workshop was to present and solicit stakeholder input on various related analysis efforts including the cost model for economic evaluation of the proposed regulation, supplemental economic analysis, local government cost survey, recycling and composting GHG emission reduction factors, and environmental impacts analysis.

The revised draft regulatory language, summary of the draft regulation, and the Cost Study on Commercial Recycling Final Draft Report were published for public comment in December 2010. At the January 19, 2011, stakeholder workshop, CalRecycle staff solicited stakeholder comments on the revised draft Commercial Recycling Regulation and on the supporting cost data and environmental impacts. The comment period extended through January 26, 2011. Following the January 2011 workshop, CalRecycle and ARB staff met with representatives of several groups in an attempt to reach consensus on several outstanding issues. The meetings included representatives from organizations such as the California Association of Realtors, California Apartment Association, California Resources Recovery Association, Californian's Against Waste, and Solid Waste Association of North America.

On July 19, 2011, CalRecycle and ARB staff held the last informal public workshop seeking stakeholder comment on the AB32 Mandatory Commercial Recycling regulation (a followup conference call also was conducted on July 27 for those unable to hear the workshop over the webcast). Staff presented the latest version of the draft regulation (with changes to the regulatory language since the January 19, 2011, workshop), the summary of the regulation, and the results of additional economic analyses completed for the proposed regulation. Staff provided the stakeholders the opportunity to send comments by the end of July. The details of the workshop can be found at: http://www.calrecycle.ca.gov/Actions/PublicNoticeDetail.aspx?id=466&aiid=448.

C. Informal Meetings, Presentations, Teleconferences, Phone Calls

In addition to the above listing of information stakeholder workshops, CalRecycle and ARB staff coordinated with several stakeholders in response to their related comments. There have been numerous phone calls, emails, and meetings with stakeholders. The major occasions wherein staff engaged with stakeholders concerning the proposed regulation include:

2009

- March, 2009: Informal Stakeholder Discussion/Meeting with CalRecycle staff and various representatives from local government, environmental groups, and industry to discuss the scope of this project and gain their collective experience and perspective.

- August, 2009: California Resource Recovery Association Annual Conference 2009, Speaker: Tracey M. Harper, CalRecycle

- October 14, 2009: Sunset Waste Systems: Bi-Annual Round Table, Speaker: Tracey M. Harper, CalRecycle

- October 15, 2009: Rural Counties Environmental Services Joint Powers Authority, Board of Directors' Meeting, Speaker: Tracey M. Harper, CalRecycle

- November 4, 2009: Southern California Waste Management Forum, Speaker: Howard Levenson, CalRecycle

- December 10, 2009: Recycling Forecast Luncheon, Mid-Valley Disposal, Harris Ranch, Speaker: Tracey M. Harper, CalRecycle

2010

- April 13, 2010: BioCycle, West Coast Conference, San Diego, Speaker: Brenda K. Smyth, CalRecycle

- April 28, 2010: Association of State and Territorial Solid Waste Management Officials Mid-Year Meeting, Los Angeles, Speaker: Marshalle Graham, CalRecycle

- May 4, 2010: Contra Costa AB 939 Program Managers and Climate Protection, Quarterly Roundtable Meeting, Speaker: Tracey M. Harper, CalRecycle

- May 20, 2010: Rural Counties Environmental Services Joint Powers Authority, Board of Directors' Meeting, Speakers: Howard Levenson and Cara Morgan, CalRecycle

- August 17, 2010: CalRecycle team meeting with Cal Chamber, California League of Food Processors, California Manufacturers & Technology Association, California Business Properties Association, California Association of Realtors, California Grocers Association, California Apartment Association

- September 2, 2010: CalRecycle staff presentation via conference call with Solano County

- September 30, 2010: Enforcement Advisory Council Meeting, Speaker: Howard Levenson, CalRecycle

- October 13, 2010: County Counsel's Association, Speaker: Elliot Block, CalRecycle

- October 14, 2010: Sunset Waste Systems Bi-Annual Recycling Round Table, Fresno, Speaker: Tracey M. Harper, CalRecycle

- November 5, 2010: Solid Waste Association of North America's Annual Meeting. Speakers: Howard Levenson and Cara Morgan, CalRecycle.

- November 9, 2010: Stanislaus Green Ideas Expo, Modesto Speaker: Marshalle Graham, CalRecycle

- November 18, 2010: Los Angeles County Solid Waste Local Task Force, Speakers: Howard Levenson and Cara Morgan, CalRecycle.
- December 1, 2010: Monterey Local Task Force Meeting, Attendees: CalRecycle Local Assistance and Market Development (LAMD) staff
- December 14, 2010: 2010 Ventura Cities and County Regional Gathering, Speaker: Marshalle Graham, CalRecycle
- December 16, 2010: Rural Counties Environmental Services Joint Powers Authority, Board of Directors' Meeting, Speakers: Howard Levenson and Cara Morgan, CalRecycle.

2011

- January 2011: Solid Waste Local Enforcement Agency Roundtables, Attendees: CalRecycle staff
- February 9, 2011: Green Team San Joaquin meeting, Speaker: CalRecycle LAMD staff
- February 9, 2011: Kings Waste and Recycling Authority meeting, Speaker: CalRecycle LAMD staff
- February 16, 2011: San Mateo Countywide Recycling, Speaker: CalRecycle LAMD staff
- February 23, 2011: League of California Cities Inland Empire Chapter Legislative Task Force Meeting
- March 24, 2011: Environmental Services JPA meeting in Sacrament, Speakers: Howard Levenson and Cara Morgan
- April 8, 2011: Solid Waste Management Advisory Committee (SWMAC) meeting in Bakersfield, Speaker: CalRecycle LAMD staff
- April 28, 2011: Placer County Recycling Coordinator's regular meeting, Speaker: CalRecycle LAMD staff
- May 25, 2011: Regional Recycling Public Information Group, Speakers: Marshalle Graham & Tracey Harper, CalRecycle
- July 7, 2011: SWANA Task Force meeting, Speaker: Cara Morgan, CalRecycle
- July 13, 2011: Meeting with CalChamber representatives, Speaker: Cara Morgan, Brenda Smyth, Clark Williams, CalRecycle

D. Institute of Local Government Outreach

Through a contract with the Institute of Local Government (ILG), outreach was made to all cities and counties in the State concerning mandatory commercial recycling. A sample ordinance was developed and distributed as well as made available on their website, http://www.ca-ilg.org/. Additionally, ILG's website contains several case studies to assist local jurisdictions in their efforts to develop and implement a mandatory commercial recycling program. CalRecycle participated in five webinars held by ILG highlighting these and other related resources, listed below. Over 100 stakeholders participated in each of the webinars. Additionally, the webinar recordings and presentations are available on the ILG website. A link to this information is also provided on the CalRecycle web page under the mandatory commercial recycling measure.

1. June 30, 2010: Adopting A Commercial Recycling Ordinance – How to Get Started
2. October 6, 2010: Creating Effective Commercial Recycling Education and Outreach Activities
3. December 16, 2010: Creating Enforcement and Compliance Elements for Commercial Recycling
4. April 7, 2011: Recycling Programs at Apartment Complexes: Success Tips for Local Officials
5. May 2, 2011: Understanding California's Proposed Commercial Recycling Regulations: What Local Agencies Need to Know About the Education, Outreach and Monitoring Requirements

E. Public Outreach and Implementation After Adoption of the Proposed Regulation

CalRecycle will continue to provide technical assistance to local jurisdictions and businesses in the form of regional workshops training, model ordinances and contracts, decision making tools and other resources as requested by local jurisdictions and businesses. This will include, for example, guidance on how CalRecycle will assess the provision regarding mixed waste processing facilities and achieving diversion comparable to source separation, as well as how CalRecycle will evaluate individual outreach, education, and monitoring programs.

Additionally, throughout the 2.5 year informal stakeholder engagement effort, CalRecycle has developed a number of related public outreach and implementation connections and partnerships, including:

- Commercial Recycling Climate Calculator;
- Waste Reduction Awards Program; and
- Recycling Market Development Zone program.

Commercial Recycling Climate Calculator – To help businesses evaluate how to improve waste management practices to save money and lower their environmental impact, CalRecycle developed a Commercial Recycling Climate Calculator. This tool is designed for virtually any California business or multifamily complex to assess the

financial, climate change, and diversion benefits of reducing and recycling and/or composting their discarded materials. Intial education and outreach efforts include showcasing this tool at soliciting feedback at the June 16, 2010 informal stakeholder feedback workshop, as well as other related public forums, such as the CalRecycle Recycling Market Development Zone training workshops in 2009 and 2010.

CalRecycle's calculator complements both the Air Resources Board (ARB) and Department of Toxic Substances Control (DTSC) tools developed for use by business, industry, and the general public to gauge their carbon footprint and reduce greenhouse gas emissions. As a result, parallel to mandatory commercial regulation implementation, CalRecycle is partnering with these agencies to promote these tools via agency web pages that cross reference the individual tools, press releases, and a fact sheet. These tools will also be the basis for promotion through various business related associations and organizations, including the Governor's Office of Economic Development, CalChamber, California Association for Local Economic Development (CalED), and the California Association of Recycling Market Development Zones (CARMDZ).

Waste Reduction Awards Program – CalRecycle's Waste Reduction Awards Program (WRAP) provides an opportunity for California businesses and nonprofit organizations to gain public recognition for their outstanding waste reduction efforts and lets the community know the business takes waste reduction seriously. One component of the application addresses greenhouse gas emission reductions. The aforementioned calculator and related tools from ARB and DTSC are and will continue to be promoted in this section of the WRAP application as well as within its related web resources. Reciprolcally, ARB and DTSC's tools and related outreach materails reference WRAP.

Recycling Market Development Zone Program -- In addition to providing training on the related tools and resources for businesses at the biannual Zone Works training workshops, CalRecycle also coordinates with the Recycling Market Development Zone administrators to promote these tools to businesses directly and through related partnerships such as Small Business Development Centers, economic development centers, and local agencies.

Additionaly, as new programs and tools are developed, they will be incorporated into the aforementioned education and outreach materials. For example, the economic analyses for this regulation were based in part on CalRecycle's waste characterization studies (http://www.calrecycle.ca.gov/WasteChar/WasteStudies.htm) and future program evaluation will also be based on such studies. This updated information will be included in the education and outreach tools for local government and businesses to identify and target specific sectors, waste types, etc.

Another related project that will, when completed, support the education and outreach related to mandatory commercial recycling is CalRecycle's Facility Information Toolbox Project. When implementing any diversion program, a critical consideration is the impact on the existing solid waste management and recycling infrastructure. The Project is aimed at providing a centralized source of information on California waste

management and recycling facilities. This tool will help CalRecycle staff, Recycling Market Development Zone administrators, local governments, and businesses in determining if future material generation amounts or programs under consideration for implementation or expansion could be supported within existing regional processing facility capacity limits and/or require infrastructure infrastructure.

CARMDZ, in partnership with the Greater Stockton Chamber of Commerce, California Product Stewardship Council, CalED, and Calfornia Resources Recovery Association has formed the Recycling Build Infrastructure Now (BIN) Coalition in an effort match the increase of recyclable materials resulting from this regulation with new incentives for developing more local recycling manufracturing infrastructure and associated “green” jobs. The Reccling BIN Coalition’s first summit is scheduled for August 9, 2011 (http://www.greenteamsanjoaquin.com/recycling-bin.htm) in Stockton. CalRecycle has helped to get the word out to interested parties about this opportunity by providing information at the July 19, 2011 informal stakeholder workshop, e-mail message to local government, and via listserv messaging.

CalRecycle is in the process of compiling these and other related resources into a general business assistance web portal at http://www.calrecycle.ca.gov/business/. This resource is anticipated to be completed by spring 2012.

As the state-of-the-science improves, data accuracy and availability for the RERFs and CERF may continue to increase. This will allow embellishments to the RERFs and CERF that may focus on, but not be limited to: open loop recycling, more up-to-date process emission data, improved scientific understanding of the composting process, or development of factors for new materials.