CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: HONORABLE MAYOR AND CITY COUNCIL

FROM: Toni J. Taber, MMC
City Clerk

SUBJECT: **SEE BELOW**

DATE: November 6, 2025

SUBJECT: Climate Smart San José Zero Waste Element Report

Recommendation

As recommended by the Transportation and Environment Committee on October 6, 2025:
(a) Accept the Climate Smart San José Zero Waste Element Report.
(b) Approve the Zero Waste Element implementation into the Climate Smart San José Plan.
CEQA: Exempt, File No. PP17-001, Statutory Exemption for Feasibility and Planning Studies with no commitment to future actions. (Environmental Services)
[Transportation and Environment Committee referral 10/6/2025 Item (d)2]

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: TRANSPORTATION AND ENVIRONMENT COMMITTEE

FROM: Jeff Provenzano

SUBJECT: **See Below**

DATE: September 15, 2025

Approved

Date: 9/17/2025

COUNCIL DISTRICT: CITYWIDE

SUBJECT: Climate Smart San José Zero Waste Element Report

RECOMMENDATION

(a) Accept the Climate Smart San José Zero Waste Element Report.

(b) Cross-reference this report to the November 18, 2025, City Council meeting for consideration and approval by the full City Council to incorporate this element into the Climate Smart San José Plan.

SUMMARY AND OUTCOME

The Climate Smart San José plan[1] (Climate Smart) identified solid waste as a topic for future consideration that could be incorporated into updates of the Climate Smart plan. The waste reduction and diversion goals in the Zero Waste Element (ZWE) will help the City move towards its goal of carbon neutrality by 2030 and also serves as an update to the 2008 Zero Waste Strategic Plan.

Compostable materials disposed of in landfills account for approximately 20 percent of the methane emissions in California.[2] One ton of methane in the atmosphere has over 80 times the warming impact of one ton of carbon dioxide for 20 years after it's released, making it a particularly destructive greenhouse gas (GHG). Reduction of waste generated and disposed would thereby reduce the GHG emission impacts of solid waste which contribute to climate change.

By implementing the new zero waste strategies in the proposed ZWE, the City could reduce the GHG emissions released in San José by approximately 244,000 metric tons

[1] The original Climate Smart San José plan can be accessed here: https://www.sanjoseca.gov/home/showpublisheddocument/32171/636705720690400000
[2] CalRecycle. 2025. "California's Short-Lived Climate Pollutant Reduction Strategy." Available at: https://calrecycle.ca.gov/organics/slcp

of carbon dioxide equivalent per year. In 2021, Environmental Services Department (ESD)-managed solid waste and recycling programs diverted 63 percent of waste from landfills. By implementing zero waste strategies, the City aims to reach 82 percent diversion from landfills by 2030 and 96 percent diversion from landfills by 2050.

City Council (Council) approval of the proposed ZWE would allow staff to proceed with ZWE implementation and formally incorporate its strategies and metrics into the Climate Smart plan during the next plan update. As outlined in the original Climate Smart plan, updates to the plan are intended to follow the Envision San José 2040 General Plan's (General Plan's) four-year review cycle. This approval would also confirm the City's support for the ZWE's goals and actions, without changing the City's General Plan.

BACKGROUND

In 2008, the City adopted its Zero Waste Strategic Plan and established a goal of zero waste by 2022, becoming one of the first cities in the nation to do so. In San José, zero waste is defined as landfilling no more than 10 percent of waste. This standard recognizes that there will continue to be some materials, including legacy materials generated in prior decades (such as treated wood and asbestos), that must be landfilled at the end of their useful life. In February 2018, Council approved the Climate Smart plan, with specific goals and milestones to reduce communitywide GHG emissions in alignment with the 2016 Paris Agreement, designed to prevent global temperatures from rising by more than 2ºC (or 3.6ºF), which includes milestones to significantly reduce GHG emissions by 2050. Climate Smart focuses on three targeted climate action areas - mobility, energy, and water – and the associated quality of life co-benefits. In 2019, the City declared a "climate emergency." In November 2021, Council adopted a resolution to work towards communitywide carbon neutrality by 2030, and in June 2022 approved the Pathway to Carbon Neutrality by 2030 to further focus staff's efforts and accelerate work towards this new goal. Council approved the addition of a Natural Working Lands Element to the Climate Smart plan in April 2023.

The Climate Smart plan identified solid waste as a topic for further study. The ZWE proposes a roadmap to reduce solid waste-related GHG emissions and reduce material to landfills, and serves as an update to the 2008 Zero Waste Strategic Plan. This work aligns with efforts at the state level to address zero waste in the context of climate change. California's Department of Resources Recycling and Recovery (CalRecycle) is working with a contractor to identify gaps in its existing programs and develop a comprehensive statewide Zero Waste Plan to move California away from a single-use economy to a fully circular and zero waste economy. CalRecycle is expected to publish its Zero Waste Plan in 2026.

Climate Smart staff conduct periodic estimates of GHG emissions resulting from activities in San José (communitywide GHG inventories) to provide a benchmark for San José's progress towards its carbon neutrality goal. The communitywide GHG

inventories (most recently completed for 2023[3] and previously conducted 2008, 2014, 2017, 2019 and 2021 inventories) help the City to evaluate the impact of its initiatives and programs. In the 2023 communitywide GHG inventory, solid waste accounted for 8 percent of total communitywide GHG emissions. The 2023 inventory informed the 2025 update to the Climate Smart plan, which aims to ensure the City's climate strategies remain targeted, up-to-date and identify areas where adjustments or new approaches are needed. The strategies identified in the proposed ZWE can contribute to the City's goal of carbon neutrality by 2030 while also providing valuable co-benefits such as preventing waste and reducing climate impacts associated with production and transportation of goods before they are managed as waste.

ANALYSIS

Zero Waste Element Development Process

ESD staff, in coordination with consultants, Ruth Abbe and Associates and Cascadia Consulting Group, developed the ZWE in three stages: first, a technical analysis leading to a draft ZWE; second, community and stakeholder engagement; and third, this updated proposed ZWE to align with the City's 2021 community wide GHG inventory and to reflect new legislation leading to the final, proposed ZWE. The 2021 community wide GHG inventory was utilized for the analysis since that was the most current information available at the time. These stages are detailed further below.

In the first stage of work, from 2020 to 2023, ESD staff and consultants worked to define the scope of the ZWE, assess the City's net GHG emissions resulting from the solid waste sector, and to reevaluate the prioritization of the City's zero waste strategies. The analysis also included the effects of changing waste regulations on City programs, and local reuse potential and infrastructure related to solid waste and landfill capacity. Consultants utilized data collected during the first stage to create a draft ZWE, which was further refined by City staff. The ZWE focuses only on ESD-managed solid waste programs and services for the following sectors: residential, commercial, construction & demolition, and City facilities. This scope was chosen because the ZWE serves as an update to the 2008 Zero Waste Strategic Plan, and the City has direct control over these areas. Conversely, sectors like schools, colleges, jails, self-hauled materials, encampment trash, illegal dumping, and litter were excluded from the analysis due to limited City influence or concurrent efforts to address these issues.

In the second stage of work, ESD Staff conducted a series of outreach and engagement events from January 17, 2024, to February 11, 2024. This was done to ensure the ZWE accurately reflected the priorities and concerns of the community. This included a

[3] 2023 Inventory of Communitywide Greenhouse Gas Emissions: https://www.sanjoseca.gov/home/showpublisheddocument/122510/638866287441830000

community survey, a community meeting, and an online open house, where over 200 community members provided feedback.

City staff sent invitations to the community meeting directly to representatives of neighborhood associations, business associations and community-based organizations. Information on the survey and how to participate in the meetings and provide feedback through the online open house portal was also shared publicly on the City website and in social media posts by ESD.

In the third stage of work, which occurred in 2024 and early 2025, ESD, in coordination with the third-party consultant, Cascadia Consulting Group, updated the draft ZWE. The update incorporated community feedback regarding priority strategies, revised GHG estimates associated with each strategy, and incorporated information on new California legislation regarding single-use packaging and single-use plastic food ware.

The project team then conducted three separate analyses to understand the potential of each zero waste strategy to divert waste from landfill and thereby lead to GHG emissions reductions. First, an emissions analysis showed total waste-related GHG emissions from City-managed waste programs. The project team gathered activity data and then calculated San José's waste-related GHG emissions associated with landfill, composting, and anaerobic digestion. Next, an avoided emissions analysis specified the total GHG emissions reductions achieved if the ZWE's diversion goals are met. Finally, a diversion potential forecast revealed the amount of waste diverted and the associated GHG emissions reductions by strategy, if the strategies are implemented to an extent that meets the ZWE's diversion goals.

Structure and Impact of the Proposed ZWE

The proposed ZWE includes goals, strategies, milestones, and supportive City actions for reducing the GHG emissions associated with solid waste while aligning with the City's General Plan. It follows the Zero Waste Hierarchy (shown in Figure 1 below) by focusing first on rethinking and redesigning systems, then reducing, and finally reusing items to prevent waste. Within this framework, staff also considered four key factors to guide zero waste strategy development:

1. Support state efforts to reduce methane emissions from compostable materials in landfills.
2. Minimize disposal to preserve landfill capacity.
3. Prevent waste to address the climate and waste impacts associated with production and transportation of goods before they are managed as waste.
4. Provide racially equitable, inclusive, and culturally competent services.

Figure 1: Zero Waste Hierarchy

The proposed ZWE lays out 13 broad City-led zero waste strategies (Figure 2) that reflect all areas of the Zero Waste Hierarchy besides destructive disposal. It also includes three foundational strategies – community engagement, materials characterization, and research & development – which underpin all other strategies. Destructive disposal was not included as it is the least favorable waste management solution and does not support the City's zero waste goal.

Figure 2: The Element's Zero Waste Strategies

The analysis in the proposed ZWE shows that the ZWE strategies could reduce GHG emissions by approximately 244,000 metric tons of carbon dioxide equivalent (MTCO2e) per year.

Role of the City and Next Steps

If approved by Council, the goals, strategies, milestones, and supportive City actions in the proposed ZWE will be incorporated into the Climate Smart plan during the next plan update and, as with the other Climate Smart plan goals, the City would be supporting the advancement of goals associated with the ZWE.

Climate Smart San José Analysis

The proposed ZWE supports the goals of Climate Smart San José. Its strategies to reach zero waste are expected to:

- Reduce net GHG emissions associated with disposal of solid waste
- Reduce energy or water use consumption, or increases in demand for renewable energy

EVALUATION AND FOLLOW-UP

Staff will provide progress updates to the Transportation and Environment Committee and/or Council as part of the Climate Smart San José updates.

COST SUMMARY/IMPLICATIONS

Approval of the ZWE will not result in any immediate City funding needs. As indicated in the ZWE, it is aligned with the General Plan and staff will typically play a supportive role to further its goals by providing recommendations to residents and businesses. Staff may seek grants or present budget proposals in alignment with ZWE initiatives in future budget processes.

COORDINATION

This memorandum has been coordinated with the City Attorney's Office, the City Manager's Budget Office, and the Department of Energy.

PUBLIC OUTREACH

This memorandum will be posted on the Council Agenda website for the October 6, 2025 Transportation and Environment Committee meeting.

Staff shared the draft ZWE with community stakeholders through a series of outreach and engagement events from January 17, 2024, to February 11, 2024. This included a community survey, a community meeting, and an online open house. Invitations to the community meeting were sent directly to representatives of neighborhood associations, business associations and community-based organizations. Information on the survey and how to participate in the meetings and provide feedback through the online open house portal was also shared publicly on the City website and in social media posts by ESD.

COMMISSION RECOMMENDATION AND INPUT

On November 21, 2024, the Climate Advisory Commission received a briefing on the Zero Waste Element. The Commission did not take formal action on the item.

CEQA

Exempt, File No. PP17-001, Statutory Exemption for feasibility and planning studies with no commitment to future actions. This Zero Waste Element identifies strategies to meet the City of San José's Climate Smart goals, but there is no commitment to future actions or approvals of projects.

PUBLIC SUBSIDY REPORTING

This item does not include a public subsidy as defined in section 53083 or 53083.1 of the California Government Code or the City's Open Government Resolution.

/s/
Jeff Provenzano
Director, Environmental Services

For questions, please contact Valerie Osmond, Deputy Director, Integrated Waste Management, at valerie.osmond@sanjoseca.gov or (408) 535-8557.

ATTACHMENT
Zero Waste Element

CLIMATE SMART SAN JOSÉ

Zero Waste Element

Updated April 2025

All of us together can make ZERO

Message from Jeff Provenzano, Director of Environmental Services

Let's not throw away this opportunity

How does San José become a zero-waste city?

It takes effort from every resident, business, stakeholder, and City organization to help make San José a zero-waste city. As you know, the world has limited resources and sending items to landfill wastes valuable resources.

Like its parent document, Climate Smart San José, this Zero Waste Element highlights what we, as a City, along with the community, can do to lower carbon emissions that contribute to climate change. Specifically, this Element focuses on reducing waste and finding alternatives to disposal.

The key to meeting zero-waste goals is to move away from efforts that make a person's day difficult and link waste reduction to the good life that includes more experiences, emphasizes a better community, and makes life easier for everyone.

Through design, our current waste collection programs do a great job of preventing most waste from going to landfill, but there is still much work to do and opportunities to leverage that can make a difference.

This Element includes actions that are innovative, cost-effective, and inclusive.

Implementing the actions in this Element is only part of an ongoing effort to work with our residents, businesses, and City to meet our sustainability goals.

We look forward to having you participate in this effort and appreciate your ideas and contributions.

Jeff Provenzano

Director, Environmental Services Department

City of San José

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Acronyms and Definitions

CALGreen: California green building code.

California Department of Resources Recycling and Recovery (CalRecycle): The state department that oversees California's waste reduction and waste management programs.

Carbon Neutrality: Net zero greenhouse gas emissions within a given year from fuel use, grid-supplied energy, and treatment of waste.[1]

Construction & demolition (C&D) waste: Waste from construction processes, which is not typically sent to landfill.

City of San José (City): The San José city government.

City facilities: Buildings and other locations owned and managed by the City, including offices, parks, and public buildings.

Climate Smart San José (Climate Smart): The City's communitywide initiative to address climate change.[2] This Zero Waste Element is a component of Climate Smart.

Commercial waste commodities: Solid waste collected from commercial facilities, including source-separated recycling ("customized"), source-separated organics ("wet"), and non-organic garbage ("dry").

Compostable materials: Materials typically accepted for use in industrial compost or digestion systems.

Consumption: The process of obtaining and using goods and services.

Diversion: The process of directing materials away from landfill or incineration by recycling, composting, or other organics processing.

Environmental Services Integrated Waste Management Division (IWM): The City Division that oversees garbage collection, recycling, and innovative programs to enhance quality of life in San José.

Greenhouse gas (GHG): A type of heat-trapping gas that warms the atmosphere and causes climate change, such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Greenhouse gases are released during the combustion of fossil fuels and during some organic processes, such as the decay of organic material in an environment containing little to no oxygen.

Legacy materials: Materials generated in prior decades that must be landfilled at the end of their useful life (such as treated wood and asbestos from existing buildings).

1 City of San José to Pledge Carbon Neutrality by 2030 | News List | City of San José (sanjoseca.gov)
2 Climate Smart San José. Available at: https://www.sanjoseca.gov/your-government/departments-offices/environmental-services/climate-smart-san-jos

Materials Recovery Facility (MRF): A solid waste management plant that receives, separates, and prepares recyclable materials for marketing to end-user manufacturers.

Metric tons of carbon dioxide equivalent ($MTCO_2e$): A way of describing emissions of a gas based on its climate change-causing potential.

Paris Climate Agreement: An international agreement to take action on climate change adopted by 196 countries and cities at Conference of the Parties (COP) 21 in Paris, on December 12, 2015.

Plastic Pollution Prevention and Packaging Producer Responsibility Act (SB 54): This California state law, passed in 2022, sets standards for single-use packaging and plastic food serviceware items to ensure that these items are effectively recycled or composted. It also creates a requirement to reduce plastic single-use packaging and plastic food serviceware. These goals are to be met through an extended producer responsibility (EPR) program, which shifts the burden for responsibly managing materials at the end of their useful life from local governments to the producers of the materials.

Problem materials: Materials that do not have a viable market for recycling or composting. Examples include painted or treated wood and composite materials (items made up of two or more material types, such as sporting equipment, solar panels, and plastic-lined envelopes)

Recyclable materials: Materials for which recycling technologies, programs, and markets are well developed, readily available, and currently utilized.

Renewable: Any material or energy source that can or will be replenished naturally in the course of time.

Solid waste: Discarded materials disposed of in landfills and incinerators.

Sustainable harvesting: A method of harvesting that provides a constant supply of resources throughout the landscape, with future resource yields unaffected or improved by current harvesting methods.

United States Environmental Protection Agency (EPA): The national agency tasked with overseeing environmental protection programs and regulations.

Zero waste: The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health.[3] To reach zero waste, San José aims to reach 90 percent diversion from landfills by 2050.

Zero Waste International Alliance (ZWIA): An international group that sets forth internationally recognized zero waste standards, policies, and best practices for communities and businesses.

3 ZWIA "Zero Waste Definition." 2018. Available at: https://zwia.org/zero-waste-definition/

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00 Executive Summary

Zero Waste is Part of the Climate Solution

The City of San José (City) has long been a leader in zero waste, providing cutting-edge programs to its residents and businesses and investing in innovative technology solutions. This Zero Waste Element (Element) looks at zero waste through the lens of Climate Smart San José (Climate Smart), the City's climate action plan aligned with the Paris Climate Agreement (Paris Agreement).

The Zero Waste Element is designed to supplement the strategies in Climate Smart by mitigating the climate impacts of solid waste (discarded materials disposed of in landfills and incinerators) and consumption (the use of goods and services by residents, businesses, City operations, and others).

San José is prioritizing programs to reduce waste, which is at the top of the zero-waste hierarchy (see Zero Waste Strategies and Figure 1). Therefore, the City has set goals both to reduce the amount of waste that is sent to landfills and to reduce the overall amount of waste generated in San José. Strategies are based on the hierarchy and contain a foundational category that supports all levels of the hierarchy.

Implementing new zero waste strategies will help the City reduce waste and increase diversion from landfill disposal while contributing to the City's goal of carbon neutrality by 2030. By implementing the new zero waste strategies in the Zero Waste Element, the City aims to reduce greenhouse gas (GHG) emissions released in San José by approximately 244,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year (see Figure 2).

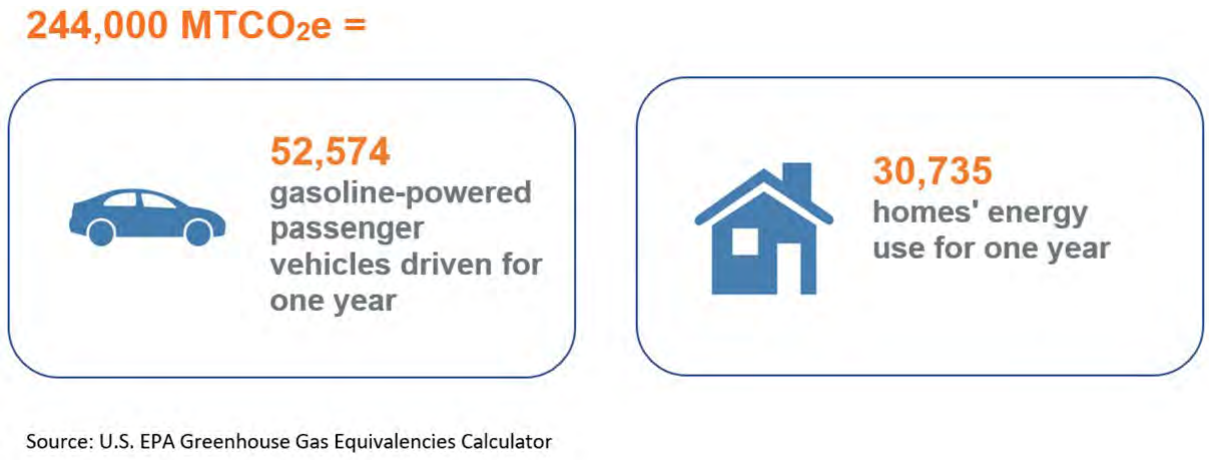
The strategies will also reduce GHG emissions associated with the production, processing, and transportation of goods that are used and disposed of in San José. Although these lifecycle emissions are not currently measured in San José's communitywide GHG inventories, they make up a significant proportion of the total emissions associated with goods and are critical to address.

Figure 1. Zero Waste Hierarchy[4]

In 2021, the City-managed solid waste and recycling programs diverted 63 percent of waste from landfills and residents generated 0.8 tons of waste per person per year. By implementing zero waste strategies, San José aims to reduce generation to 0.7 tons per person per year by 2030 and 0.5 tons per person per year by 2050. Through these strategies, San José also aims to reach 82 percent diversion from landfills by 2030 and 96 percent diversion from landfills by 2050.

4 Zero Waste International Alliance. "Zero Waste Hierarchy." Available at: https://zwia.org/zwh/

Figure 2. Approximate Yearly $MTCO_2e$ Reductions[5]



Source: U.S. EPA Greenhouse Gas Equivalencies Calculator

The scope of this Element is City-managed solid waste programs and services for the following sectors: residential, commercial, construction & demolition, and City facilities. Waste that is not managed through City programs includes waste from school and college campuses, jails, self-hauled materials, illegal dumping, and litter. Schools, colleges and jails typically have waste services provided through their own contractors, and the City has limited influence on these services.

Over the Zero Waste Element planning timeframe, The City will pursue these focus areas based on the zero-waste hierarchy:

- **Foundational strategies** support all other strategies through engagement, data collection, and research.
- **Rethink/Redesign** strategies reduce lifecycle impacts of goods by making purchasing more sustainable.
- **Reduce** strategies focus on waste prevention to decrease the amount and toxicity of waste generated.
- **Reuse** strategies extend the life of reusable materials and save edible food to feed hungry people.
- **Recycle/Compost** strategies support and expand systems to keep materials in their original production loop and protect the full usefulness of the materials.
- **Materials Recovery** strategies maximize recovery of materials from mixed waste after source separation. Source separation is defined as the process of sorting and separating various types of waste materials at their point of origin.

5 U.S. EPA. 2023. "Greenhouse Gas Equivalencies Calculator." Available at: epa.gov/energy/greenhouse-gas-equivalencies-calculator.

Plan Structure

The *Climate Smart San José Zero Waste Element* consists of four chapters outlining San José's solid waste system and strategies to address climate change and reduce the amount of landfilled waste in San José.

1. **Plan Development** provides a background to the planning process, including an introduction to Climate Smart San José, the City's climate and zero waste goals, current state legislation, and key factors considered in the development of zero waste strategies.

2. **Programs and Leadership to Date** describes San José's waste management programs and leadership in the zero-waste field.

3. **Zero-Waste Strategies** showcases the City's planned strategies to make strides towards zero waste across six focus areas. It also outlines the GHG emissions reduction and waste diversion potential of each strategy and an overview of innovative solutions that are beyond the planning horizon of this Element.

4. **Community Playbooks** offer ideas to help residents and businesses better understand and implement zero waste initiatives.

Roadmap of Strategies

The Element outlines 13 strategies and detailed actions across six focus areas that the City will implement to reduce GHGs and make strides toward zero waste. The City expects that all strategies will positively impact the climate and the City's waste generation and diversion goals. Some strategies provide a foundation for the City's other strategies, while others create direct, quantifiable benefits beyond the City's current diversion tons and GHG emissions reductions. Figure 3 presents the six focus areas and their associated strategies. Numbers are rounded to the nearest hundred. While the total diversion tons and emissions reductions may not appear to equal the sum of all parts, each figure is rounded independently to reflect the most accurate whole number. Some strategies do not have quantified emissions reductions or diversion tons because they are supportive of other strategies.

Figure 3. Zero Waste Strategies and Impacts

		Target Annual Diversion Tons	Target Annual $MTCO_2e$ Reduced
FOUNDATIONAL	Community Engagement	47,200	29,900
	Materials Characterization	NA	NA
	Research & Development	NA	NA
RETHINK/REDESIGN	Sustainable Packaging	59,600	22,400
	Sustainable Purchasing Citywide	29,600	13,800
REDUCE	Lead by Example	4,700	3,000
	Food Waste Prevention	8,300	8,200
REUSE	Surplus Food Recovery	300	200
	Repair & Reuse	4,400	15,200
RECYCLE/ COMPOST	Construction & Demolition Recycling	29,400	80,800
	Reduce Disposal of Compostable Materials in Landfills	57,600	105,000
	Recycling Market Development	1,100	4,000
MATERIALS RECOVERY	Technology for Higher Diversion	64,900	123,400
	Annual Total	**307,300**	**244,300**

Recommended Actions

The table below lists the 31 recommended actions for the City to implement. Recommendations are categorized as either short-term (implemented within 8 years or less) or long-term (planned to be implemented after 8 years). The 8-year timeframe aligns with current waste hauler contract lengths.

FOUNDATIONAL

Strategy	Action	Short (S) or Long (L) term
Community Engagement	Design and implement education/behavior change programs that identify and address barriers to community waste reduction, reuse, and recycling.	S
Community Engagement	Build and maintain relationships with community-based organizations and schools, particularly equity priority communities.	S
Community Engagement	Create outreach materials and ensure that signage and messaging are clear and appropriate for San José's diverse communities.	S
Community Engagement	Evaluate the effectiveness of community programs by collecting feedback from residents and businesses. Integrate feedback into solid waste programs and public outreach.	S
Materials Characterization	Conduct regular waste characterization studies to identify diversion opportunities and track progress towards waste reduction goals.	S
Materials Characterization	Evaluate and leverage waste characterization data to design zero waste strategies, policies, and community engagement initiatives.	S
Materials Characterization	Evaluate and leverage waste data to inform collection, processing, and disposal contracts.	L
Materials Characterization	Expand waste characterization, diversion and disposal studies to assess programs services, operations and improve zero waste strategies.	L
Materials Characterization	Incorporate municipal solid waste management best practices into collection, processing and hauler contracts.	L

Strategy	Action	Short (S) or Long (L) term
Research and Development	Support innovation by working with industry, government, and educational partners on research, development, and policies.	L
Research and Development	Fund and implement pilots to find solutions to reduce generation and disposal of problem materials and items that are hard to reuse, recycle, or compost.	S
Research and Development	Conduct research to inform future municipal collection infrastructure requirements for new multi-use and high-density developments.	L
Research and Development	Develop solid waste set-out guidelines that maximize public right-of-way access for multi-modal transit and collection vehicles.	L

RETHINK/REDESIGN

Strategy	Action	Short (S) or Long (L) term
Sustainable Packaging	Build awareness about the impacts of SB 54 through community campaigns.	S
Sustainable Packaging	Expand state-level efforts to reduce the impacts of single-use plastics and plastic food serviceware through pilots and promoting behavior change.	L
Sustainable Purchasing Citywide	Review purchase practices for City office supplies and equipment.	S
Sustainable Purchasing Citywide	Pilot the use of reusables within City operations and at community event.	S

REDUCE

Strategy	Action	Short (S) or Long (L) term
Lead by Example	Generate support from residents and businesses for zero waste programs by implementing pilot projects in City operations.	S
Lead by Example	Monitor and expand successful pilot projects in City operations; share successes with the community.	L
Food Waste Prevention	Reduce residential and commercial food waste through citywide education and outreach campaigns.	S
Food Waste Prevention	Participate in research or programs led by Joint Venture Silicon Valley to prevent food waste among businesses and organizations.	S

REUSE

Strategy	Action	Short (S) or Long (L) term
Surplus Food Recovery	Continue to enforce surplus food donation as required under SB 1383.	S
Surplus Food Recovery	Improve equitable access to food by identifying and addressing capacity limitations in the regional food recovery system.	S
Surplus Food Recovery	Explore a neighborhood gleaning program to donate excess fruit from residential fruit trees to food recovery organizations.	S
Repair & Reuse	Promote reuse, rental, and repair through online directories, material exchanges, and direct assistance.	S
Repair & Reuse	Coordinate repair fairs and fix-it clinics in neighborhood centers and libraries.	S
Repair & Reuse	Expand refill opportunities for residents and businesses.	S

RECYCLE/COMPOST

Strategy	Action	Short (S) or Long (L) term
Construction & Demolition Recycling	Explore new incentives and/or mandates to help increase diversion at C&D facilities.	S
Construction & Demolition Recycling	Based on findings, implement incentives and/or mandates to promote resource recovery at C&D facilities. Continue to explore opportunities to enhance the C&D program.	L
Reduce Disposal of Compostable Materials in Landfills	Continue to enforce SB 1383 requirements that minimize the disposal of compostable materials in landfills.	S
Recycling Market Development	Support market and infrastructure development for recycling commodities and continue to leverage the City's Recycling Market Development Zone program.	L

MATERIALS RECOVERY

Strategy	Action	Short (S) or Long (L) term
Technology for Higher Diversion	Increase diversion by pursuing enhanced technology upgrades in the City's waste processing facilities.	L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01 Plan Development

Overview

This chapter provides background on the development of this Zero Waste Element, including context for the City's emphasis on waste prevention. The strategies presented in this Element build on the zero waste commitment that has guided the City since 2008. They also reflect the City's multiple commitments to take ambitious action to address climate change.

Specifically, this chapter discusses:

- Climate Smart San José, the overarching planning effort that this Element will support.
- Other plans and policies that shaped the development of this Element, including the City's Zero Waste Goal, the City's commitment to the C40 Cities Advancing Zero Waste Declaration, and state policies related to climate and waste management.
- The Zero Waste Hierarchy, which is the primary material sustainability framework the City uses to emphasize waste prevention.
- Key factors considered in developing zero waste strategies for this Element.
- A summary of community feedback received throughout the planning process and how input shaped the final contents of the Element.

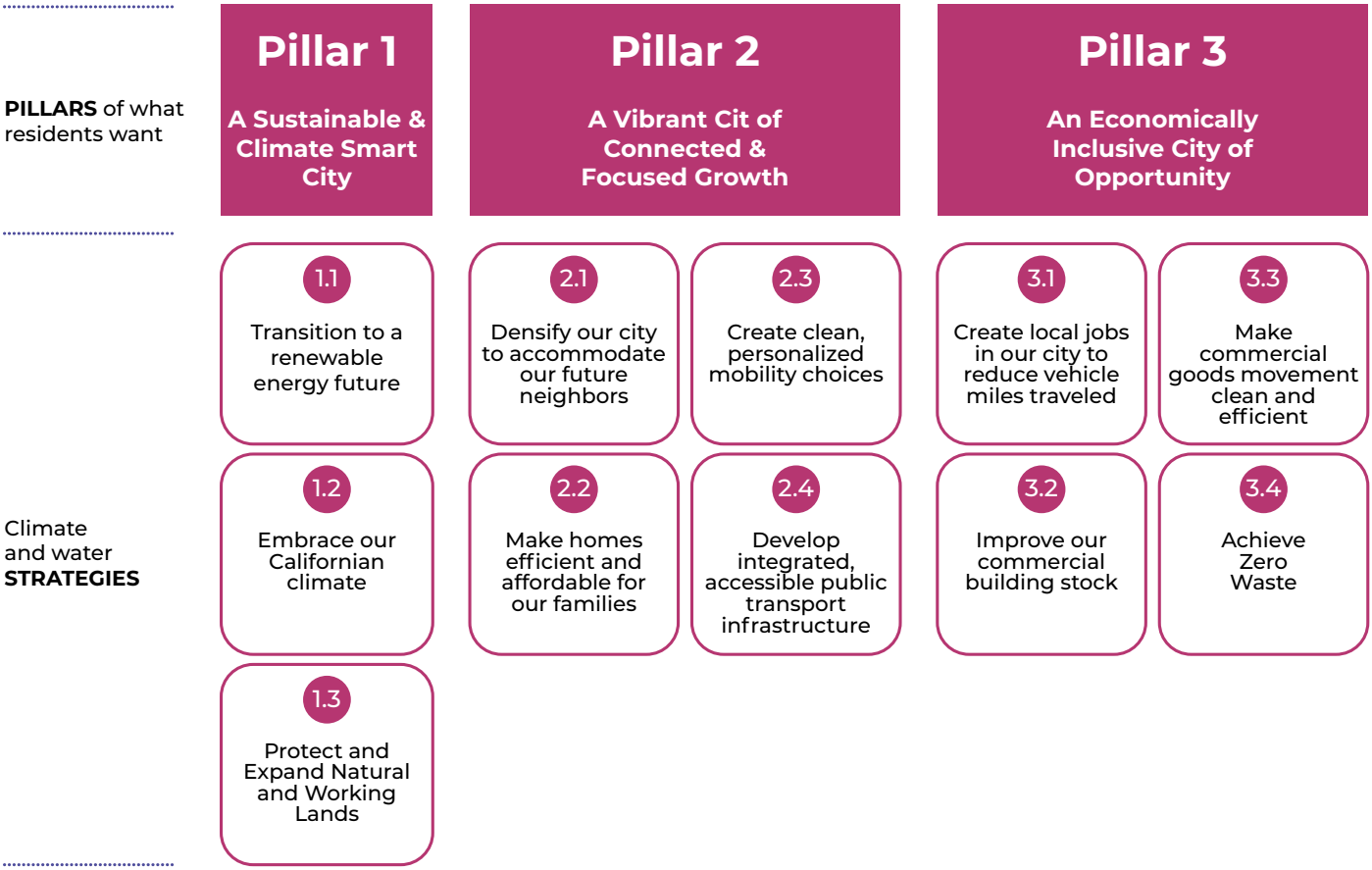
Climate Smart San José

With the adoption of Climate Smart in 2018, San José joined 392 other cities across the U.S. that promised to honor and uphold the Paris Agreement. Climate Smart set ambitious goals for energy, water, transportation, and local jobs.

In 2019, San José joined nearly 1,000 local governments across 18 countries to declare a Climate Emergency. As part of the declaration, San José committed to prioritizing efforts to become a zero-waste city. Then, in November 2021, the San José City Council passed a resolution to achieve carbon neutrality by 2030. As a result, the Zero Waste Element was created as an update to the Climate Smart plan and the City developed the Pathway to Carbon Neutrality by 2030, which recommends focused and accelerated Climate Smart strategies. The Element supports these goals by presenting strategies to mitigate the climate impacts of solid waste.

The Element will be integrated into Climate Smart as a new strategy in Pillar 3 (see Figure 4).

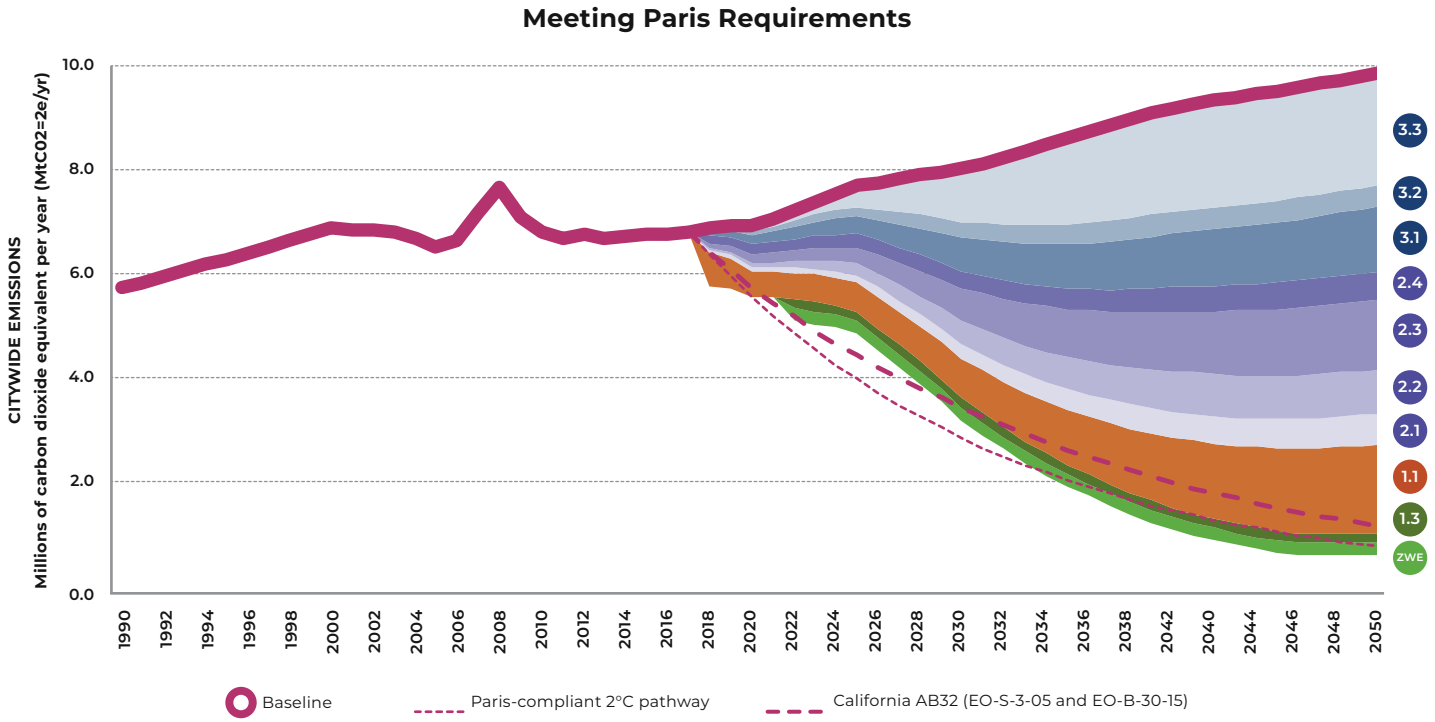
Figure 4. Climate Smart Pillars and Strategies



Meeting Paris Agreement Requirements

By implementing the waste prevention and diversion strategies identified in the Element, San José aims to reduce GHG emissions within the City by approximately 155,000 $MTCO_2e$ by 2030 and 244,000 $MTCO_2e$ per year by 2050 (see Figure 5). The predicted emission reductions resulting from San José Climate Smart's 10 Strategies are shaded in blue, purple, and orange and the predicted emission reductions resulting from the Zero Waste Element are highlighted in green. Together, these measures will lead the City along a Paris Agreement-aligned 2°F pathway.

Figure 5. Estimated $MTCO_2e$ Emission Reductions



Climate Smart GHG Reduction Strategies

- 1.1 Transition to a renewable energy future
- 1.3 Natural and Working Lands Element contribution
- 2.1 Densify our city to accommodate our future neighbors
- 2.3 Create clean, personalized mobility choices
- 2.4 Provide high-quality, accessible public transit infrastructure
- 2.2 Provide affordable, efficient homes for our families
- 3.1 Create local jobs in our city to reduce VMT
- 3.2 Improve our commercial building stock
- 3.3 Make commercial goods movement clean and efficient

ZWE

Zero Waste Element contribution to meeting the Paris Agreement

(~244 Thousand $MTCO_2e$ in 2050)

Other Plans and Policies

San José's Zero Waste Goal

In 2008, San José adopted its Zero Waste Strategic Plan and established a goal of zero waste, becoming one of the first cities in the nation to do so. San José embraces the aspirational goal of zero waste and recognizes the internationally peer-reviewed definition of zero waste, developed by the Planning Group of the Zero Waste International Alliance (ZWIA) in 2004.[6]

Zero waste starts with reducing waste by rethinking and redesigning to fully reduce the climate, health, and other impacts associated with solid waste. What cannot be prevented should be accounted for through reuse, diversion, and recovery, with landfill disposal as a last resort.

Recognizing that there will continue to be some materials, including legacy materials generated in prior decades (such as treated wood and asbestos), that must be landfilled at the end of their useful life, San José's performance measure for zero waste is 90 percent diversion from landfills.

San José defines zero waste as: Promoting the highest and best use of materials to eliminate waste and pollution, with the ultimate goal of reducing waste generation by more than 90 percent. Zero waste entails shifting consumption patterns, more carefully managing purchases, and maximizing the reuse of materials at the end of their useful life. Ultimately, it calls for the City, residents, and businesses to reevaluate what is considered waste.

6 ZWIA. 2018. "Zero Waste Definition." Available at: https://zwia.org/zero-waste-definition/.

CASE STUDY:

Ashley Merz opened The Source Zero, a zero waste lifestyle store in downtown San José, in 2018.

Her shop provides household, clothing, and body care products with many refillable and reusable options (instead of single-use disposables). It offers workshops, speakers, and do-it-yourself classes.

The store represents an independent way of sourcing materials, products, and goods. Ashley also supports other women-owned small businesses by offering their products for sale.

> “It can be difficult to go completely zero waste... but it’s not about going completely zero waste or being perfect. It’s about each small action that a person can take. One small action leads to another and then another.”
>
> *- Ashley Merz*

C40 Cities Advancing Toward Zero Waste Declaration

In 2018, San José joined other international leaders in zero waste to define specific milestones and commitments by joining as a signatory to the C40 Cities Advancing Toward Zero Waste Declaration. San José was one of the 23 pioneering cities and regions that committed to significantly cutting the amount of waste they generate, accelerating them on the path toward zero waste.

The City committed to:

1. Reducing waste generation per capita by at least 15 percent by 2030 compared to 2015; and

2. Reducing the amount of materials disposed of in landfills by at least 50 percent by 2030 compared to 2015, and increasing the diversion rate away from landfill to at least 70 percent by 2030.

The Zero Waste Element builds on these commitments and identifies the policies, programs, and infrastructure needed to achieve these goals. By implementing the policies and programs highlighted in this Element, San José is expected to exceed C40 targets in 2030 and establish new leadership levels for 2040 and 2050 (see Table 1).

Table 1. Projected C40 Targets

	2021	2030 (Projected)	2040 (Projected)	2050 (Projected)
Generation Tons Per Capita	0.8	0.7	0.6	0.5
Landfill Disposal Tons	315,000	157,000	78,500	31,400
Diversion Rate	63%	82%	91%	96%
Carbon Emissions from Waste Sector ($MTCO_2e$)	248,000	124,000	62,000	25,000

California State Laws

Recognizing the urgency of the climate crisis and the need to act boldly to protect California's future, the California State Legislature has passed several pieces of legislation to reduce GHG emissions by reducing waste and increasing recycling and composting statewide. Most of these bills have requirements that are implemented at the local level. The strategies outlined in this Element account for and leverage state regulations, and the City will assist its residents and businesses in complying with state requirements. For example, the zero waste strategies of community engagement, surplus food recovery, and food waste prevention will support the City and its residents in meeting the requirements of California's Short-Lived Climate Pollutant Reduction Law (Senate Bill 1383).

Table 2 presents existing statewide policies related to waste reduction and diversion.

Table 2. California Waste Reduction and Diversion Policies

2011	**Mandatory Commercial Recycling (Assembly Bill 341)** Establishes a statewide goal of 75 percent source reduction, recycling, and composting by 2020. Requires large commercial generators and multifamily complexes to recycle.
2014	**Mandatory Commercial Organics Recycling (Assembly Bill 1826)** Requires large commercial generators and multifamily complexes to divert organics from landfill by subscribing to collection service, managing organics on-site, or self-hauling organics to a processing facility.
2016	**Short-Lived Climate Pollutant Reduction (Senate Bill 1383)** Establishes targets to achieve a 50 percent reduction in the statewide disposal of compostable materials waste from the 2014 level by 2020. It also aims to accomplish a 75 percent reduction by 2025, and establishes an additional target that not less than 20 percent of currently disposed of edible food is recovered for human consumption by 2025.
2019	**Customer Access to Recycling (Assembly Bill 827)** Requires businesses, public entities, and schools to provide recycling and compostable materials containers adjacent to garbage containers.
2022	**Plastic Pollution Prevention and Packaging Producer Responsibility Act (Senate Bill 54)** Establishes a statewide goal that by 2032, all single-use packaging and single-use plastic foodware will be recyclable or compostable. It also creates goals for 65% of single-use plastic packaging and single-use plastic foodware to be recycled by 2032, and 25% of single-use plastic packaging and single-use plastic foodware to be source reduced by 2032.

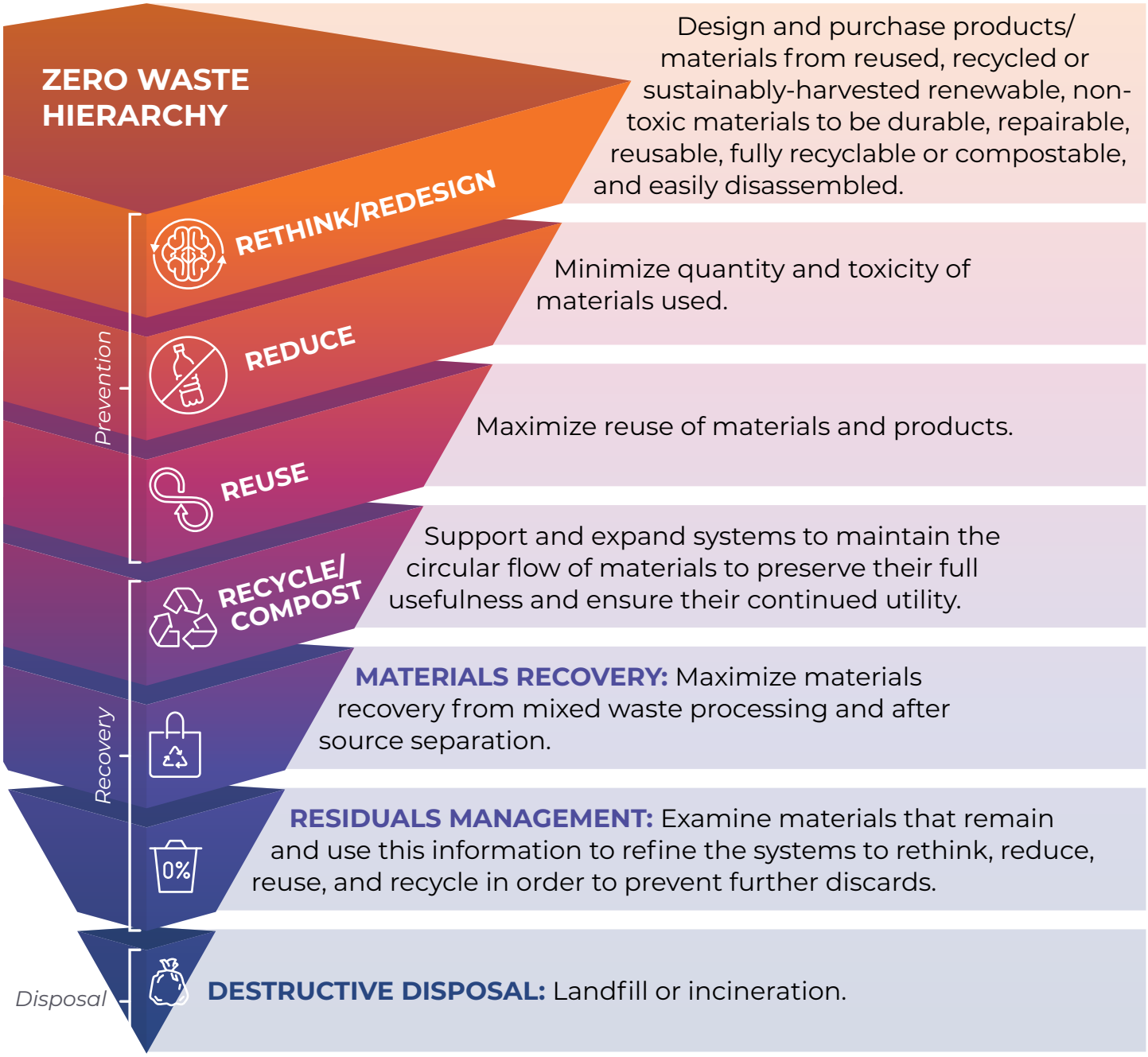
Appendix A-1 includes an expanded description of the Mandatory Commercial Organics Recycling Law (Assembly Bill 1826), the Short-Lived Climate Pollutant Reduction Law (Senate Bill 1383), the Plastic Pollution Prevention and Packaging Producer Responsibility Act (Senate Bill 54), and the requirements for implementation of these programs.

Appendix A-2 describes the requirements of a key regional strategy, the Bay Area Basin-Wide Methane Strategy, which was developed to reduce the region's methane emissions in support of the California Air Resource Board's methane reduction goal (40-45 percent below current levels by 2030). The Bay Area Basin-Wide Methane Strategy focuses on limiting emissions from significant methane releases, including regional landfills, through a proposed set of rules.

Zero Waste Hierarchy

The zero waste hierarchy, created by the Zero Waste International Alliance (Figure 1 and Figure 6), describes a progression of policies, programs, and infrastructure to support the development of a zero waste system, from highest and best to lowest use of materials. The components of the hierarchy are presented in more detail in Figure 6.

Figure 6. Zero Waste Hierarchy Components



The Zero Waste Element of Climate Smart includes the first five focus areas of the zero waste hierarchy, as well as a "Foundational" focus area with strategies that support all of the levels of the zero waste hierarchy, except disposal. This Element does not include disposal, which is the least favorable waste management solution and does not support the City's zero waste goal.

Key Factors Considered in Strategy Development

In developing the strategies in the Element, the City evaluated its ten-year waste management options and considered additional sustainable solid waste management systems. These are described in Appendix A-3. The strategies constitute the best available approaches for reducing waste and maximizing recovery in order to achieve GHG emissions reductions..

Within this framework and in concert with existing waste management plans and policies, the City considered four key factors to guide zero waste strategy development.

The factors are described as follows:

1. **Support state efforts to reduce methane emissions from compostable materials in landfills:** Align with state efforts to prevent food waste, rescue food, and improve composting rates.

2. **Minimize disposal to preserve landfill capacity:** Reduce waste generation and improve diversion rates to preserve nearby landfill capacity for hard- to-recycle materials and legacy materials in the next few decades.

3. **Prevent waste to address lifecycle impacts:** Emphasize strategies that reduce waste generation to avoid the climate and waste impacts associated with production and transportation of goods before they are managed as waste. It is important for San José to support efforts to reduce solid waste-associated GHG emissions that occur beyond the city's boundaries given their connection to our community.

4. **Build on the Inclusivity of Climate Smart San José:** Provide racially equitable, inclusive, and culturally competent services.

Support state efforts to reduce methane emissions from compostable materials in landfills

Compostable materials disposed of in landfills contribute the largest share of GHG emissions associated with waste generated within the city. When they decompose in landfills, compostable materials release methane, a powerful GHG.

According to CalRecycle, compostable materials waste in landfills accounts for approximately 20 percent of the methane emissions

in California.[7] One ton of methane in the atmosphere has over 80 times the warming impact of one ton of carbon dioxide for 20 years after it's released, making it a particularly destructive GHG.

State legislation (SB 1383) recognizes the outsized climate impacts of disposing of compostable materials and sets targets to recover edible food and divert compostable materials from landfill. Several of the zero waste strategies in this Element support this legislation by minimizing the disposal of compostable materials in landfill.

Minimize disposal to preserve landfill capacity

The City aims to increase diversion from landfill and reduce waste generation in part to conserve landfill capacity throughout the next few decades.

Several landfills within Santa Clara County are slated to close within the next 15 to 35 years, including Newby Island Sanitary Landfill (estimated closure date 2041), Guadalupe Sanitary Landfill (estimated closure date 2048), and Kirby Canyon Recycling and Disposal Facility (estimated closure date 2059).

When these landfills close, waste disposal costs and GHG emissions will likely increase significantly, particularly due to the need to transport waste at least 80 miles further to the nearest landfill in Monterey County, or beyond. Rethinking, reducing, reusing, recycling, composting, and recovering as much waste as possible will preserve local landfill capacity for materials that are impossible or impractical to reuse, compost, or recycle.

Prevent waste to address lifecycle impacts

The City's 2021 inventory of community-wide GHG emissions estimated that the City's solid waste sector accounts for approximately 6 percent of citywide emissions. The inventory's estimate of solid waste emissions is based on tons of materials diverted and disposed of through the City's zero waste programs for the residential, commercial, and construction and demolition (C&D) sectors.

However, this inventory does not account for the full lifecycle impacts of goods and services – the impact of materials and products over the course of their lifetimes, from creation to disposal and eventual decay.[8] A significant portion of GHG emissions and waste impacts occurs during the production and transport of goods and services, before most items reach the city's borders.[9]

While the inventory scope aligns with industry standards, it is important for San José to support efforts to reduce solid waste associated GHG emissions that occur beyond the inventory's scope given their connection to our community.

San José is aligning its

7 CalRecycle. 2023. "California's Short-Lived Climate Pollutant Reduction Strategy." Available at: https://calrecycle.ca.gov/organics/slcp/.

8 Rochester Institute of Technology. 2020. "What is life cycle assessment (LCA)?" Available at: https://www.rit.edu/sustainabilityinstitute/blog/what-life-cycle-assessment-lca.

9 Oregon DEQ. 2021. "Waste Impact Calculator Web App." Available at: https://rstudioconnect.deq.state.or.us/content/706a4deb-f353-4d08-826d-85bf7856c154/.

goals with programs aimed at waste prevention, which is at the top of the zero waste hierarchy, as envisioned by both the United States Environmental Protection Agency (EPA) and by the California Department of Resources Recycling and Recovery (CalRecycle). The hierarchy is a pyramid showing which solid waste strategies are the most preferred (waste prevention) and which should be used only after trying all other options (disposal). For example, while waste prevention through repairing and buying less clothing creates the most environmental benefits, reuse, such as donating clothes to a thrift store, is a solid second-best option.[10]

Some items have larger lifecycle waste and climate impacts than others, so these items are a higher priority for waste prevention. The Oregon Department of Environmental Quality has identified food waste, textiles, electronic waste (e-waste), and paper fiber as items with relatively large lifecycle costs.[11] Strategies in this Element will prioritize these items for reduction and recovery.

Build on the Inclusivity of Climate Smart San José

The City strives to center equity within the zero waste strategies in this Element. Racial and social equity is achieved when race or social status can no longer be used to predict life outcomes, and everyone can prosper and thrive. As a process, it explicitly prioritizes communities that have been economically deprived and underserved. It establishes a practice for creating psychologically safe spaces for racial groups that have been most negatively impacted by policies and practices.

The zero waste strategies within this Element are designed with these equity principles in mind, and provide specific considerations for the City to prioritize for equitable implementation. In alignment with these equity values, the City strives to achieve its ambitious recycling and zero waste goals across the city, while 1) adapting engagement and programmatic strategies across diverse communities in order to meet their needs, 2) considering ways to develop trust and maintain culturally sensitive communication, and 3) working to minimize any unintended consequences of programs by communicating with impacted communities through pilot programs before city-wide implementation of programs.

In the interest of language access and equity in practice, the City will continue to provide communication materials to the public in English, Spanish, and Vietnamese to reach San José's diverse community. Language translations offered are informed by socio-economic data of the communities we serve, and languages are added as the community need develops.

10 Oregon DEQ. 2023. "Waste Prevention and Reuse." Available at: https://www.oregon.gov/deq/mm/pages/waste-prevention-and-reuse.aspx; U.S. EPA. 2023. "Reducing and Reusing Basics." Available at: https://www.epa.gov/recycle/reducing-and-reusing-basics.

11 Oregon DEQ. 2021. "Waste Impact Calculator Web App." Available at: https://rstudioconnect.deq.state.or.us/content/706a4deb-f353-4d08-826d-85bf7856c154/.

How Community Feedback Shaped this Element

To ensure the Element accurately reflects the priorities and concerns of the community, the City conducted a series of outreach and engagement events from January 17 to February 11, 2024. This included a community survey, a community meeting, and an online open house.

Survey	**73** respondents	A set of 21 questions about awareness and attitudes toward recycling, composting, waste prevention, and the critical barriers and motivators related to the strategies in the Element.
Community meeting	**10** participants	A 1.5-hour virtual meeting where participants discussed which elements of the waste system they understand and care about, and how they see themselves in the Element.
Online open house	**114** comments and **5,051** site views	An opportunity for community members to provide feedback on the full Element draft in their own time.

Community members indicated that preventing waste is very important to them (including 81% of survey takers) and said that they want to see the positive impacts of recycling in their communities. Their feedback shaped the contents of the Element, as described below.

Community Feedback	Change to the Element
While some participants said that recycling is easy, others said that there are some **community barriers to recycling** in the city.	There is a call-out box in the Community Engagement strategy describing community barriers that the City can design programs to address.
Participants had **ideas for community education**, such as reaching schools, community events, and multifamily residences; improving signage; ensuring low-income communities have knowledge and resources to access waste programs; and conducting education and outreach around zero waste principles.	The Community Engagement strategy names these community priorities as considerations for future outreach and engagement.
Participants requested **more education around food waste prevention and sustainable eating**.	The Food Waste Prevention strategy notes that sustainable eating can be part of education.
Participants said that they would be interested in participating in fix-it clinics (74% of survey takers) and suggested **partnering with organizations** such as fix-it clinics, Second Harvest Food Bank, and thrift stores.	The Surplus Food Recovery and Repair & Reuse strategies name businesses and organizations that the City will explore partnerships with, including fix-it clinics.


Luxury Box Seats
ROWS 1-7
Box Seats
ROWS 1-7
Upper Reserved
Section D, ROWS 9-15
General Admission
ROWS 9-18
FLEX PLAN
$90
Buy Tickets
online at:
sjgiants.com
SAN JOSE
GIANTS
BASEBALL CLUB
I pledge
to keep
my city
clean.
THE
SAN JOSE GIANTS
ACCESSIBLE
SEATING AREA
IS LOCATED AT FIELD
LEVEL NEXT TO THE
MARTINELLI'S
VIP DECK (LF)
Madison Bumgarner
Bobblehead 7/10
FRIDAY
California League Playoffs
California League Playoffs
HOME
AWAY
SAN JOSE
Environmental Services

02 Programs and Leadership to Date

Overview

The City of San José uses its innovative waste management system and extensive data collection to understand the types and sources of waste across the city and the potential impact of zero waste strategies. The zero waste strategies in this Element build on the City's successful and award-winning programs and prioritize materials that are generated and disposed of in the largest quantities by key waste generators.

This chapter discusses:

- An overview of City waste programs, including residential, commercial, C&D, and City facilities programs.
- Data describing recycling, composting, and disposal rates and the composition of landfilled waste.

San José Integrated Waste Management Programs

The Environmental Services Integrated Waste Management (IWM) Division oversees garbage collection, recycling, and innovative programs to enhance quality of life. City staff administers waste removal in San José, managing contracts with four residential haulers, a commercial hauler, and an anaerobic digestion facility that serve more than 10,000 businesses, 216,000 single-family dwellings, 115,000 multi-family dwelling units, and about 150 City facilities. The agreements were renegotiated in 2020 and extended to 2032 for the commercial hauler and 2036 for the residential haulers.

Through its service providers, the City has invested in recycling, composting and anaerobic digestion facilities that are models for communities across the state and around the world. As the "Capitol of Silicon Valley," San José is uniquely positioned to take advantage of technology innovations and entrepreneurship. Several state-of-the art processing facilities are located in San José and Santa Clara County, including material recovery, mixed waste processing, composting, and anaerobic digestion facilities, which helps keep transportation emissions low.

This section describes the City's four waste management programs: residential, commercial, C&D, and City facilities. For each one, it describes waste collection, waste management and processing, and engagement tactics.

Residential

Collection of Residential Waste

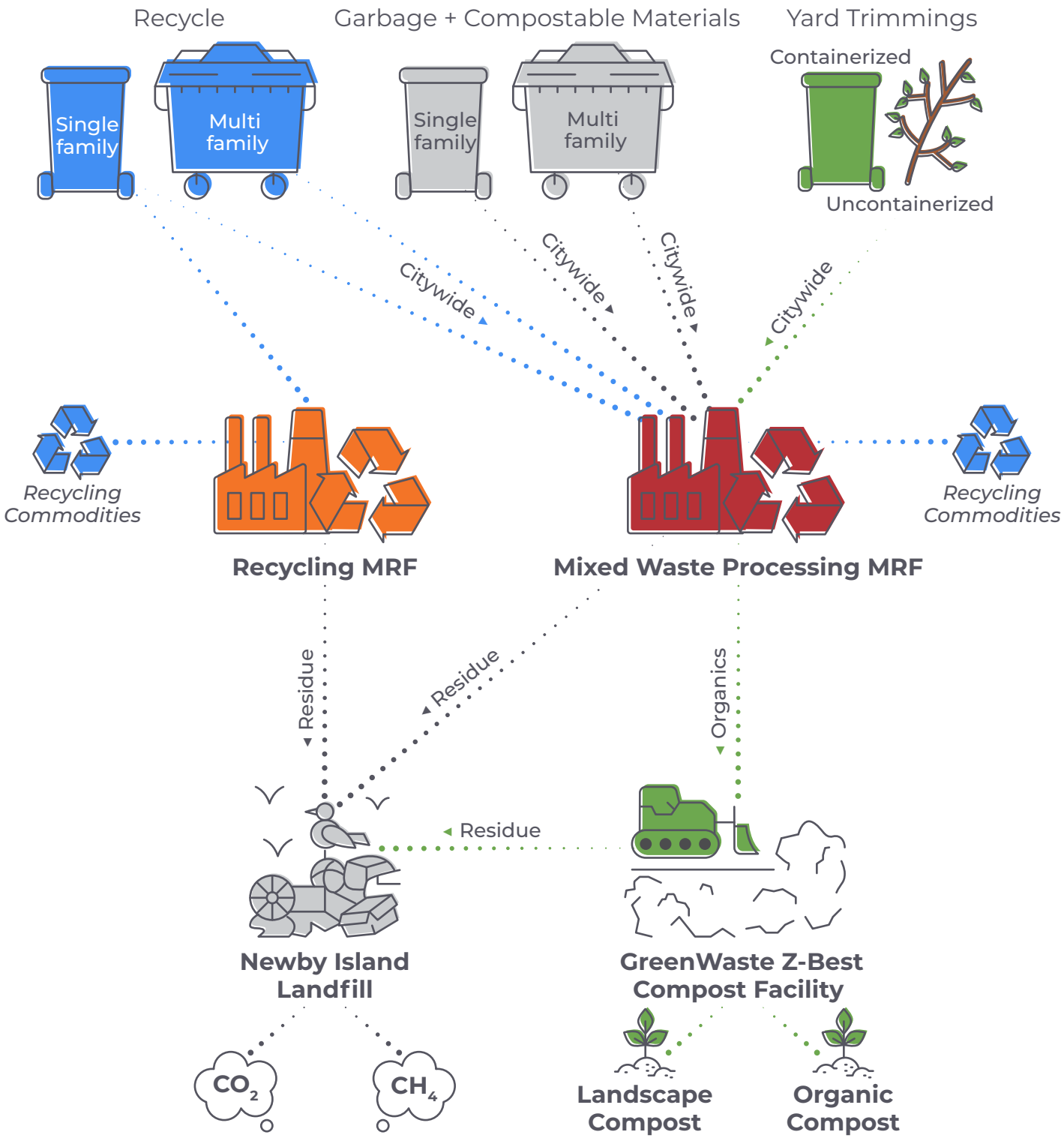
All residences are mandated by municipal code to have garbage, recycling, and yard trimmings collection service. Residential services for single-family households and multifamily complexes include multiple programs to incentivize and encourage recycling and composting over unnecessary disposal:

- The City of San José utilizes a **Pay-as-you-throw (PAYT)** system, first introduced in 1993. Residents are charged based on the amount of garbage they throw away, rather than a fixed collection fee. This provides a financial incentive to recycle more and generate less waste. If single-family dwelling residents occasionally need more capacity, they can purchase a garbage sticker and leave an extra bag of garbage next to their cart.
- Residents are offered **unlimited recycling and yard trimmings** collection. San José is one of the only cities nationwide that provides weekly collection of yard trimmings loose on the street as part of residents' garbage fee. This method allows for large quantities of clean material to be collected and composted.
- Single-family dwelling residents can order free containers and place **used motor oil and filters** on the curb next to carts for free pickup and recycling.

Processing and Disposal of Residential Waste

The City sends all recycling, yard trimmings, and garbage collected from residents to Materials Recovery Facilities (MRFs) that further sort the material and maximize diversion before the material goes to landfill (see Figure 7).

Figure 7. Residential Program Material Flow



Residential recycling is processed at MRFs in San José where commodities, including glass, metal, paper, and plastic, are collected to be sold for remanufacturing.

Yard trimmings are processed at the GreenWaste MRF, then taken to the GreenWaste Z-Best Composting Facility in Gilroy, where the compost is sold as a soil amendment to landscapers and farmers.

Residential Garbage is sorted at the GreenWaste MRF. The MRF uses technology and manual labor to remove compostable materials (food scraps and compostable paper) for composting at the GreenWaste Z-Best Composting Facility. This process ensures all residential garbage is sorted and no waste materials go directly to landfills for disposal without first being processed and recovered when possible.

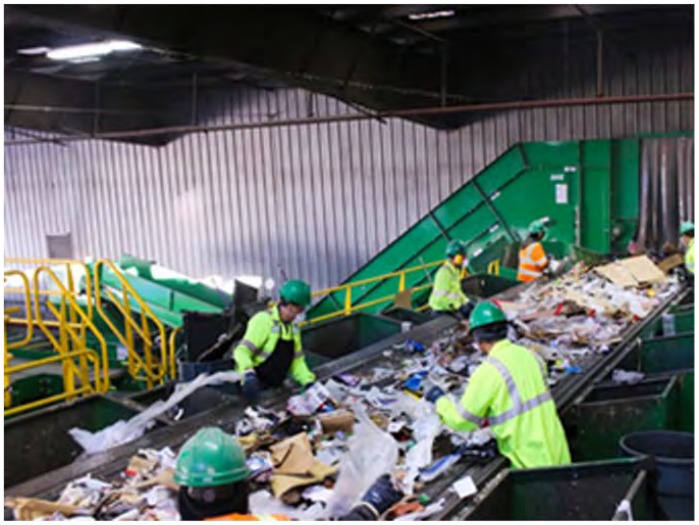
San José Residential Setout

Outreach and Engagement for Residents

Residential program staff have implemented widespread public outreach to educate residents about effective recycling, safe waste disposal, waste reduction, local regulations, and other topics. Residents receive information from:

- **The SanJoseRecycles.org website,** which includes information about what can be recycled, videos and detailed instructions about how to recycle right, frequently asked questions, and a place to sign up for the City's monthly e-newsletter.
- **The City's general services and information line (3-1-1).** Residents can use the phone line, online portal, or mobile phone app to get up-to-the-minute information on the City's programs and services.
- **Collection service providers' websites and customer service lines.** Collection and service providers also provide technical assistance to multifamily complexes through their websites and customer service lines.

In spring 2022, the City partnered with four community-based organizations to implement a major public engagement campaign. Its goals were to direct residents to SanJoseRecycles.org to recycle right and understand suggestions for community engagement moving forward. The campaign used communications tactics including digital ads, postcards, letters, flyers at community centers and libraries, bus ads, bus shelter ads, radio commercials, television commercials, television segments, videos, and social media.



GreenWaste Recovery Materials Recovery Facility

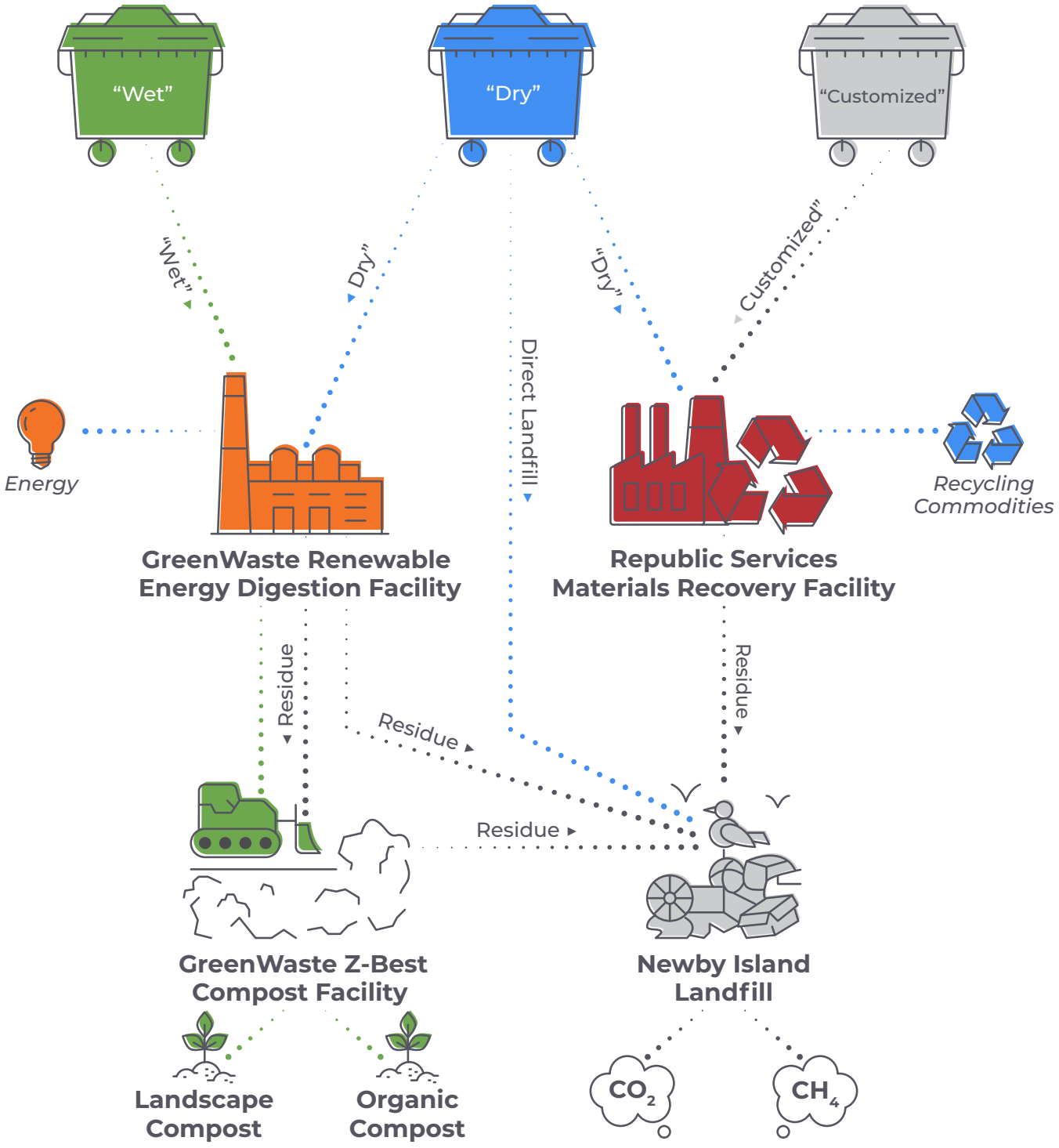
GreenWaste Z-Best Composting Facility

Commercial

Collection of Commercial Waste

Republic Services, an exclusive franchise service provider, operates the commercial solid waste collection system in San José. This specialized collection system consists of three distinct waste commodities: source-separated recycling ("customized"), source-separated compostable materials ("wet"), and non-compostable recycling and garbage ("dry"). Businesses are required to provide accompanying indoor/outdoor recycling and compostable materials containers alongside all garbage containers, and ensure proper separation of recycling and compostable materials through bin inspection and education to employees.

Figure 8. Commercial Program Material Flow



The "wet" collection service for compostable materials includes food waste, coffee grounds, landscape waste, food and drink soiled paper/fiber products, and food soiled napkins.

The "dry" collection service includes recyclables and everything not included in the "wet" service.

The "customized" option provides collection service for source separated recyclables.

Newby Island Resource Recovery Materials Processing

GreenWaste Renewable Energy Digestion Facility

Processing and Disposal of Commercial Waste

"Wet" material is processed at the GreenWaste Renewable Energy Digestion Facility in San José, the first large-scale commercial dry-fermentation anaerobic digestion facility in the United States. This facility produces clean, renewable energy while simultaneously producing a feedstock for composting.

Some "dry" material and all "customized" material are processed at the Newby Island Resource Recovery Park in Milpitas.

Outreach and Engagement for Commercial Customers

The City and Republic Services coordinate to provide information regarding waste prevention to businesses using in-person and digital tactics. Tactics include waste audits and proactive outreach visits to provide education about waste reduction and proper separation of materials. Educational materials distributed during these visits include multi-lingual brochures, posters, and quarterly postcards. The City's Business Engagement Leads and Republic's Sustainability Advisors work together to perform direct outreach to businesses, encouraging them to increase diversion and add "wet" (compostable materials) and "customized" (recycling) services. Information about waste reduction strategies is also available digitally on Republic's San José-specific website.

Construction and Demolition (C&D)

The City manages multiple non-exclusive haulers for C&D collection for new construction, remodeling, and demolition projects and residential clean-outs. Businesses and residents may choose their own hauler from a list of non-exclusive haulers or can haul the material themselves to City-certified C&D recycling facilities. These facilities can process and recycle C&D debris.

In 2001, the City of San José introduced the Construction and Demolition Diversion Deposit (CDDD) Program to incentivize building permit holders to utilize City-certified C&D recycling facilities. The program then evolved to respond to the California Green Building Code (CALGreen) Title 11 mandate: alongside the C&D diversion deposit, which mandates 50% diversion for demolitions and alterations, it incorporated a requirement to divert 75% of C&D waste from new construction and tenant improvements, aligning with CALGreen. The CDDD program acts as a bridge connecting permit holders, authorized C&D haulers, and City-Certified C&D facilities which include GreenWaste Zanker Resource Recovery Facility and Premier Recycling Company, pictured below.

GreenWaste Zanker Resource Recovery Facility

Premier Recycle Company

City Facilities

Separate recyclables collection is provided in all City facilities. Yard trimmings are also collected and composted. Garbage from City facilities and public litter containers, on public rights-of-way, and in business districts is sorted at the GreenWaste MRF where recyclable and compostable materials are recovered. With the exception of the City's corporation yards, all mixed waste from City-owned facilities is sorted to ensure no recoverable material goes directly to landfill for disposal. E-waste, including batteries and all electronic devices, is also collected from City facilities and is sent to Santa Clara County's Hazardous Household Waste Program.

The City-wide Surplus Program allows for City staff to donate any surplus items (such as furniture and tools) that could be useful to other staff from City facilities. The Surplus Program helps to promote reuse of the material, reduces the need to purchase new items, and extends products' lifecycles.

Program Awards

San José has long been a leader in sustainability and zero waste and is at the forefront of California jurisdictions in program innovation. The City has been recognized for its zero waste leadership at the state and national level and has won awards for this leadership, as listed below.

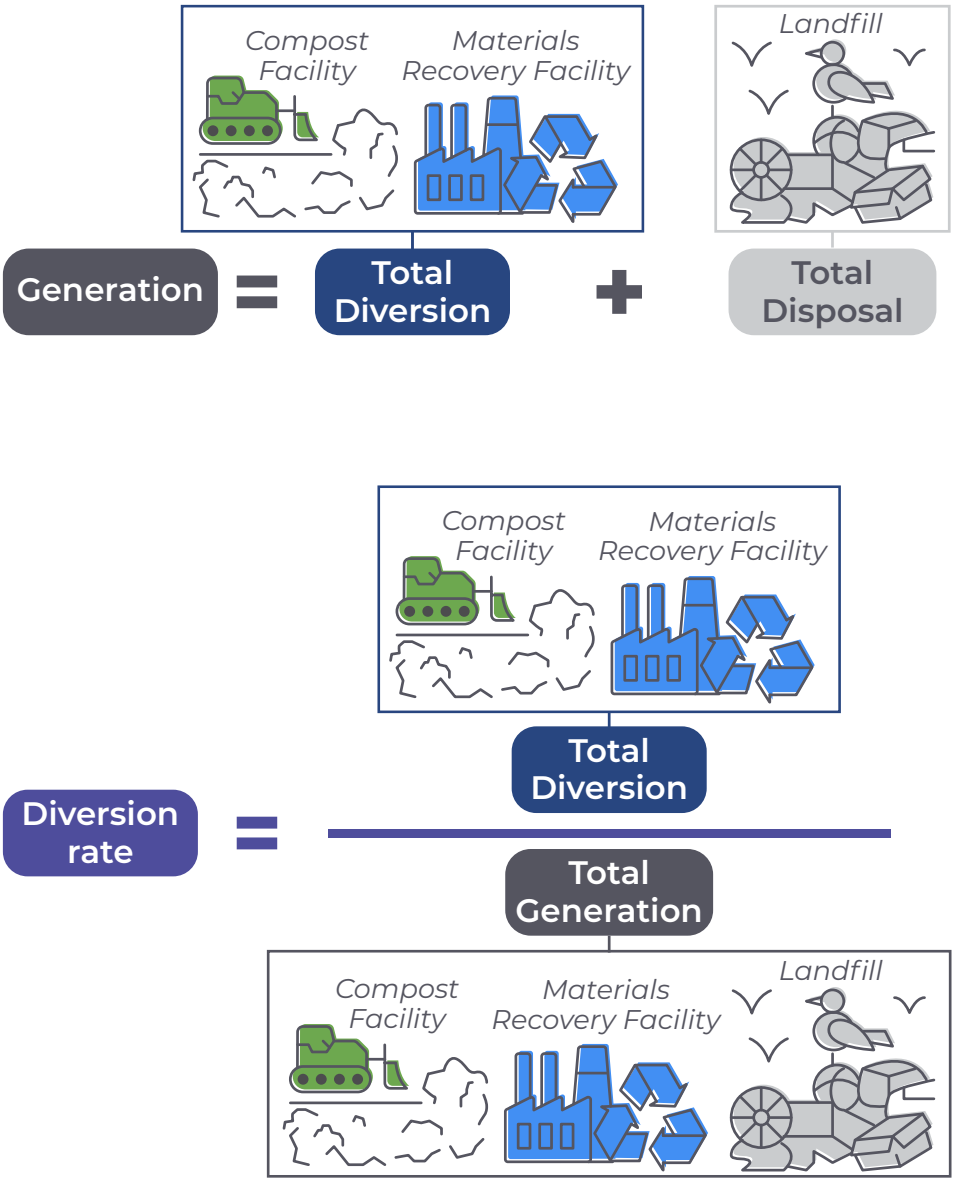
To support the City's zero waste goals, the Environmental Services Department provides assistance to other City departments to increase waste reduction and recycling.

2022 City of San José City Council Commendation	IWM Residential Program team and haulers recognized for uninterrupted collection service throughout the COVID pandemic
2017 California Resource Recovery Association	Outstanding Practices in Venue/Event Resource Recovery Award
2016 Keep America Beautiful	National Community Improvement for Litter Improvement
2016 California's Department of Resources Recycling and Recovery	Best Outreach Focused on Non-English Speakers
2015 Solid Waste Association of North America	Environmental Innovation Center Household Hazardous Waste Facility
2013 Governor's Environmental & Economic Leadership	Commercial Waste Management System
2013 Solid Waste Association of North America	Commercial Waste Management System
2012 Green City Waste & Recycling News	Residential Recycling Program
2009 California Resource Recovery Association	San José Urban Compost Marketing Program

Metrics

Diversion Rates

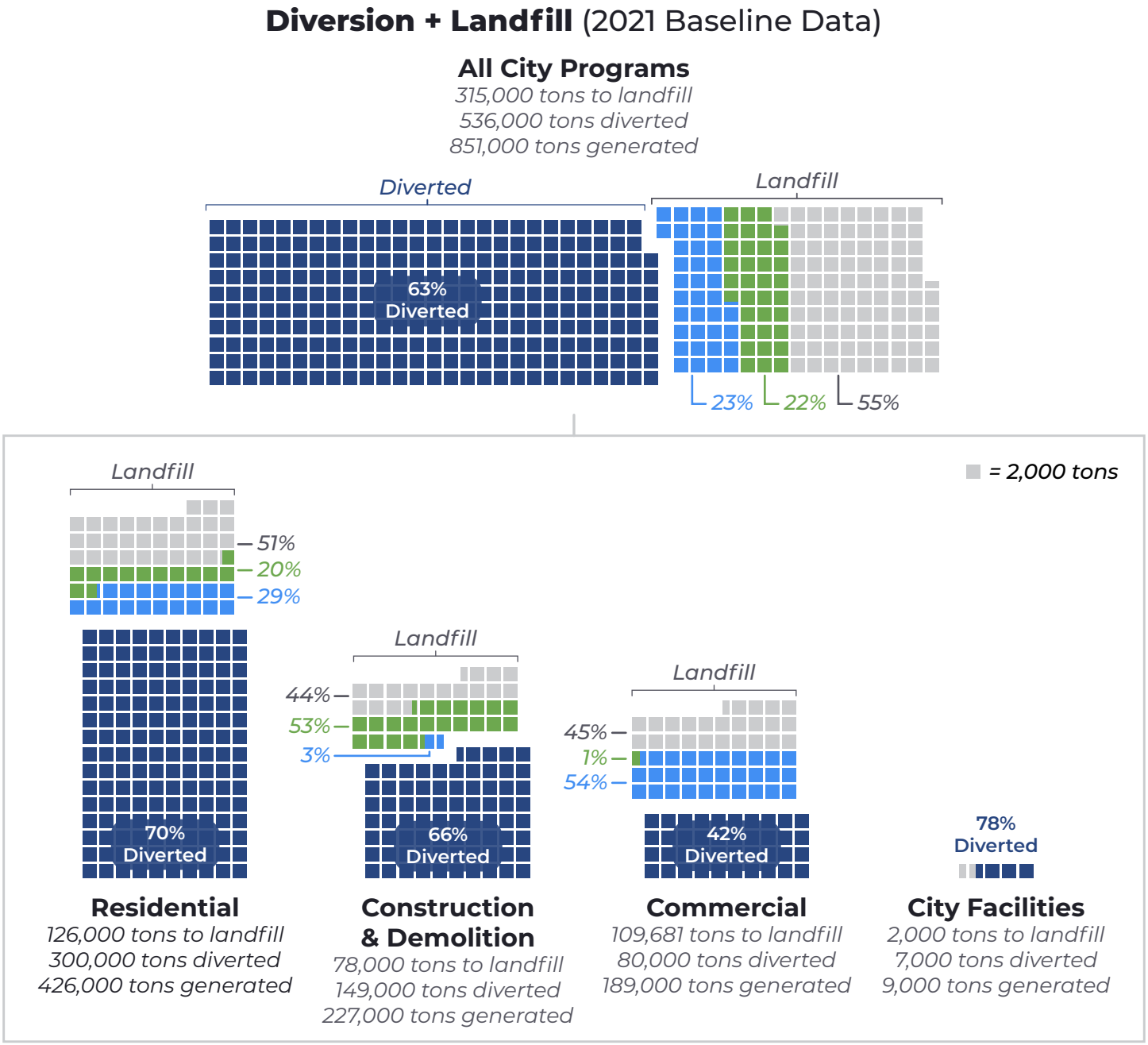
Figure 9. Generation and Diversion Rates



San José's policies, programs, and infrastructure have contributed to the City's high diversion rates. In 2021, 536,000 tons were diverted from landfill disposal through programs managed by the City, resulting in 50 percent diversion. This number does not include materials delivered to landfills from sources in San José that are not directly managed through City programs. These sources include schools, universities, hospitals, and jails, which have separate waste hauling agreements and contractors.

Diversion rates are typically expressed in the percentage of diversion from landfills using the formula outlined in Figure 9.

Figure 10. San José Calendar Year 2021 Baseline Diversion and Disposal Tons and Diversion Rate by Sector

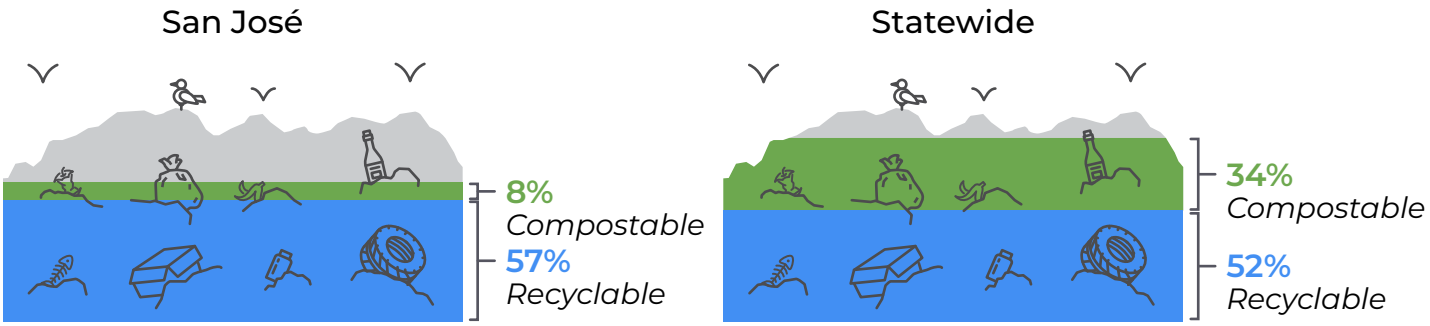


Composition of Landfilled Waste

The City conducted composition studies in 2019 to estimate the amount and types of materials disposed of in landfills from the residential and commercial sectors. Statewide characterization studies were used to estimate the composition of landfilled materials for City facilities and C&D.

These studies indicated that 65 percent of material disposed of in landfills could have been diverted for recycling or composting; of all the material landfilled, 57 percent was recyclable and 8 percent was compostable. Compared to statewide landfill composition studies, San José landfills contained a slightly larger proportion of recyclable material and a significantly smaller proportion of compostable material (see Figure 11).

Figure 11. Disposal of Compostable and Recyclable Materials in San José and Statewide



Hard-to-recycle materials

"Hard-to-recycle" refers to materials or items that pose challenges in the recycling process due to their composition or shape.

Plastic bags and polystyrene (Styrofoam) are considered hard-to-recycle materials. Polystyrene is made of more than 90 percent air, making it bulky and lightweight. These characteristics make the recycling of polystyrene inefficient due to the energy and resource costs of collection and transport.[12]

At MRFs, where recycling is sorted, plastic bags can become entangled in machinery, adding time, labor costs, and safety risks to employees who must shut down the entire operation to climb into the dangerous machinery to remove the bags.[13]

This Element aims to reduce the production and purchasing of hard-to-recycle items city-wide, both to reduce waste and make recycling easier and more efficient.

12 The Recycling Partnership. 2019. "Is Styrofoam Recyclable?" Available at: https://recyclingpartnership.org/communitiesforrecycling/is-styrofoam-recyclable/.

13 City of San José. 2020. "ESD Extra: Top Troublemakers: Plastic Bags." Available at: https://www.sanjoseca.gov/Home/Components/News/News/1750/4699?fsiteid=1.

03 Zero Waste Strategies

Overview

San José approved 13 strategies for the Zero Waste Element that focus on preventing waste to address lifecycle impacts, centering racial and social equity, preventing methane emissions from landfilled compostable materials, and minimizing disposal (see Key Factors Considered in Strategy Development). The strategies are organized into six focus areas:

- **Foundational** strategies support all other strategies through engagement, data collection, and research.
- **Rethink/Redesign** strategies reduce lifecycle impacts by making purchasing more sustainable.
- **Reduce** strategies focus on waste prevention to decrease the amount and toxicity of waste generated.
- **Reuse** strategies extend the life of reusable materials and save edible food to feed hungry people.
- **Recycle/Compost** strategies support and expand systems to keep materials in their original production loop and protect the full usefulness of the materials.
- **Materials Recovery** strategies maximize recovery of materials from mixed waste after source separation. Source separation is defined as the process of sorting and separating various types of waste materials at their point of origin.

Full implementation of each strategy will substantially decrease waste across all City programs and set the City on the path towards its goal of carbon neutrality by 2030 (see Figure 12). The diversion and GHG emissions reduction potential of some strategies were not quantified because these strategies are supportive to others.

Figure 12. San José Zero Waste Element Strategies

		Target Annual Diversion Tons	Target Annual $MTCO_2e$ Reduced
FOUNDATIONAL	Community Engagement	47,200	29,900
	Materials Characterization	NA	NA
	Research & Development	NA	NA
RETHINK/REDESIGN	Sustainable Packaging	59,600	22,400
	Sustainable Purchasing Citywide	29,600	13,800
REDUCE	Lead by Example	4,700	3,000
	Food Waste Prevention	8,300	8,200
REUSE	Surplus Food Recovery	300	200
	Repair & Reuse	4,400	15,200
RECYCLE/ COMPOST	Construction & Demolition Recycling	29,400	80,800
	Reduce Disposal of Compostable Materials in Landfills	57,600	105,000
	Recycling Market Development	1,100	4,000
MATERIALS RECOVERY	Technology for Higher Diversion	64,900	123,400
	Annual Total	**307,300**	**244,300**

Zero Waste Strategies

FOUNDATIONAL: Community Engagement

All communities in the City of San José have a role in reducing waste. To pursue a zero waste culture change, additional investment in behavior change will be needed to encourage behavior change.

The City will implement new programs to support a transition to zero waste behaviors among community members, such as reusing items, recycling right, and reducing recycling contamination. Behavior change programs involve identifying the barriers to a behavior, developing and piloting programs to overcome these barriers, implementing programs across the community, evaluating the effectiveness of the programs, and sharing ideas and success stories. The entire process underscores equitable language access and plain communications that can easily be understood by all members of the public we serve.

For each zero waste strategy, the City will lead an outreach effort to identify eligible customers, collect information, and share resources on the policies, programs, timeline, and goals. Additional behavior change outreach materials and strategies will be phased in as more zero waste strategies are finalized.

As part of this work, the City will build and maintain ongoing relationships with San José's diverse community-based organizations, schools, cultural event centers, and multifamily residences to reach residents; ensure signage and messaging are clear and appropriate; and collect feedback to improve future campaigns.

Community Input

Community members who participated in engagement for the Element said that **barriers to diverting and reducing waste** include:

- Limited access to recycling in public spaces.
- Difficulty recycling and disposing of household hazardous waste and hard-to-recycle materials.
- The convenience of single-use plastics.
- Confusing product labels.
- Uncertainty that items put into the recycling bin are recycled and lack of awareness that food waste in the wet stream is diverted.

Through the implementation of the Zero Waste Element, the City will continue to ensure that:

- All residents and businesses have access to programs and services and knowledge of zero waste principles, especially low-income, , historically under-served communities.
- Services are provided equitably and consistently across the City.
- Outreach materials are produced in multiple languages, accessible to those with disabilities, and are designed to be easy to follow.
- Fees are based on the cost-of-service and do not fall disproportionately on any one community or sector within the City.
- Community feedback shapes ongoing implementation of the zero waste strategies.

47,200 Annual Diversion Tons

29,900 Annual $MTCO_2e$ Reduced

Recommended Actions	Short or Long term
Design and implement education/behavior change programs that identify and address barriers to community waste reduction, reuse, and recycling.	S
Build and maintain relationships with community-based organizations and schools, particularly equity priority communities.	S
Create outreach materials and ensure that signage and messaging are clear and appropriate for San José's diverse communities.	S
Evaluate the effectiveness of community programs by collecting feedback from residents and businesses. Integrate feedback into solid waste programs and public outreach.	S

FOUNDATIONAL: Materials Characterization

As the City moves forward to consider future changes to its zero waste policies and programs, the City will undertake periodic characterization, diversion, and disposal studies to track progress and better understand components of the materials stream that are less understood, including C&D debris and self-haul sectors.

The City will use waste characterization data to inform future zero waste strategies and community engagement initiatives, ensuring that programs are designed to meet the greatest needs to achieve the City's goals, as well as the needs of specific communities (see FOUNDATIONAL: Community Engagement strategy).

This strategy focuses on research for future strategies. Diversion tons and GHG reduction were not quantified.

Recommended Actions	Short or Long term
Conduct waste characterization studies to identify diversion opportunities and track progress towards waste reduction goals.	S
Evaluate and leverage waste characterization data to design zero waste strategies, policies, and community engagement initiatives.	S
Evaluate and leverage waste data to inform collection, processing, and disposal contracts.	L
Expand waste characterization, diversion and disposal studies to assess programs services, operations and improve zero waste strategies.	L
Incorporate municipal solid waste management best practices into future collection, processing and hauler contracts.	L

FOUNDATIONAL: Research and Development

As the Capital of Silicon Valley, San José has been a leader in innovation and has participated in pilot studies aimed at fostering and measuring the potential of novel recycling solutions.

To encourage future technology development, the City will fund and implement programs, including pilots, to find solutions to reduce generation and disposal of problem materials and items that are hard to reuse, recycle, or compost. To do this, the City will: work collaboratively with industry, other government entities, and educational institutions; connect with the latest developments, innovation, and innovative funding (including venture capital); pursue state and federal grants geared towards waste reduction; and work with local universities and entrepreneurs on research, development, and policies to support innovations.

San José partnered with Novoloop (formerly BioCellection) to test new technology for chemical recycling of waste plastics. Novoloop converts polyethylene from plastic bags, bubble wrap, pallet wrap, agricultural film, and take-out containers into feedstock for consumer brands.

This strategy focuses on research for future strategies. Diversion tons and GHG reduction were not quantified.

Recommended Actions	Short or Long term
Fund and implement pilots to find solutions to reduce generation and disposal of problem materials and items that are hard to reuse, recycle, or compost.	S
Conduct research to inform future municipal collection infrastructure requirements for new multi-use and high-density developments.	L
Develop solid waste set-out guidelines that maximize public right-of-way access for multi-modal transit and collection vehicles.	L

RETHINK / REDESIGN: Sustainable Packaging

Packaging makes up over a quarter (27 percent) of the contents of landfills in California.[14] Because packaging originates from large companies and national or international supply chains, the national or state level is best suited to address packaging waste. San José is committed to supporting and building on state-level efforts related to SB 54, a law that addresses the impacts of single-use packaging and plastic food serviceware. To do this, the City will build awareness of state actions and potential impacts for residents, promoting behavior change in the process.

59,600 Annual Diversion Tons

22,400 Annual $MTCO_2e$ Reduced

San José's Foam Food Container Ordinance, fully effective as of January 1, 2015, requires all restaurants to use non-foam food service ware for both dine-in and takeout. San José's "Bring Your Own Bag" Ordinance, adopted in 2012, encourages waste reduction and reuse by banning plastic bags and placing a minimum 10-cent fee on bags provided by retail stores.

Recommended Actions	Short or Long term
Build awareness about the impacts of SB 54 through community campaigns.	S
Expand state-level efforts to reduce the impacts of single-use plastics and plastic food serviceware through pilots and promoting behavior change.	L

RETHINK / REDESIGN: Sustainable Purchasing Citywide

The City will be a leader in sustainable purchasing by practicing reuse and sustained use of goods, purchasing used products, and purchasing products made from recovered or recycled materials, such as compost and mulch.

The City will build upon its existing environmentally preferred purchasing policy by piloting initiatives related to sustainable purchasing within City operations with the intention of adapting and expanding them citywide. For example, the City's Environmental Services Department has piloted reusable dishes for meetings and will strategize ways to encourage and enable reuse of dishware and other items across all City departments and for community events.

29,600 Annual Diversion Tons

13,800 Annual $MTCO_2e$ Reduced

Recommended Actions	Short or Long term
Review purchase practices for City office supplies and equipment	S
Pilot the use of reusables within City operations and at community events .	S

14 CalRecycle. 2023. "SB 54: Plastic Pollution Prevention and Packaging Producer Responsibility Act." Available at: https://calrecycle.ca.gov/packaging/packaging-epr/.

REDUCE: Lead by Example

San José is a leader in implementing innovative zero waste programs for its residents and businesses.

The City will implement waste prevention and diversion best practices throughout City operations (e.g., offices, parks, and public facilities, such as libraries and community centers). In doing so, the City will generate more support from both residents and businesses for new zero waste policies and programs.

For example, the City will:

- Further advance the interdepartmental GoGreen teams or champion program to help implement sustainability initiatives in San José City facilities and operations and integrate zero waste strategies into the Climate Smart Challenge.
- Implement reduce, reuse, and recycling events, such as repair cafes.
- Promote reusable dishes at City-run programs and research other pilot projects and partnership opportunities around reusables.
- Raise awareness amongst employees of the City's Surplus Program, identify areas for improvement and increase participation from all departments.
- Explore updates to waste bin signage in City facilities to increase diversion.
- Explore additional special recycling programs to implement in City facilities.

4,700 Annual Diversion Tons

3,000 Annual $MTCO_2e$ Reduced

Recommended Actions	Short or Long term
Generate support from residents and businesses for zero waste programs by implementing pilot projects in City operations.	S
Monitor and expand successful pilot projects in City operations; share successes with the community.	L

REDUCE: Food Waste Prevention

The City will conduct citywide education and outreach campaigns to reduce household food waste. The City will leverage existing regional outreach campaigns to understand community barriers and leverage opportunities to educate its residents and businesses on how they can eat sustainably and reduce food waste at home.

The City will also participate in research or programs led by Joint Venture Silicon Valley to implement innovative food waste prevention initiatives among food-generating businesses and organizations in San José.

8,300 Annual Diversion Tons

8,200 Annual $MTCO_2e$ Reduced

Recommended Actions	Short or Long term
Reduce residential and commercial food waste through citywide education and outreach campaigns.	S
Participate in research or programs led by Joint Venture Silicon Valley to prevent food waste among businesses and organizations.	S

REUSE: Surplus Food Recovery

According to the Second Harvest Food Bank of Silicon Valley, one in four people in Santa Clara County are at risk of hunger. The City will continue to participate in the Santa Clara County Food Recovery Program in order to reduce hunger in San José and prevent the disposal of edible food in landfills.

The City will ensure that some types of large food generators, such as large hotels, restaurants, venues, and grocery stores, enter written agreements with food recovery organizations and services and donate their available surplus edible food, as required by SB 1383.

At the same time, the City will work to identify and address capacity limitations in the regional food recovery system while fostering equitable access to food and supporting food recovery initiatives. As food donations increase, it will be important to ensure that they remain high quality and match the needs and desires of the people and organizations receiving donations.

300
Annual Diversion Tons

200
Annual $MTCO_2e$ Reduced

Joint Venture Silicon Valley[15]

Silicon Valley is known for its innovation, and this extends to food recovery with the efforts of the non-profit organization Joint Venture Silicon Valley (Joint Venture). By convening stakeholders across sectors to collaborate in a non-traditional setting, stimulating investment, supporting government programs, and developing creative strategies to prevent food waste and rescue food, Joint Venture has made a major impact on the food recovery network in and around San José since launching the Santa Clara County Food Recovery Steering Committee in 2016.

Joint Venture's ongoing Food Recovery Initiative coordinates the efforts of jurisdictions and businesses to prevent food waste through a variety of projects. The Santa Clara County Food Recovery Program and its Steering Committee, another part of the Initiative, oversee the implementation of SB 1383 food recovery in the county. Most recently, the Food Recovery Initiative authored their 2022 report "Making the Most of Surplus Food," which provides recommendations on expanding food recovery and waste prevention.

Recommended Actions	Short or Long term
Continue to enforce surplus food donation as required under SB 1383.	S
Improve equitable access to food by identifying and addressing capacity limitations in the regional food recovery system.	S
Explore a neighborhood gleaning program to donate excess fruit from residential fruit trees to food recovery organizations.	S

15 Joint Venture Silicon Valley. Available at: https://jointventure.org/.

In the U.S., 40 percent of all food that is produced is wasted. Food disposed of in landfills creates methane, a potent greenhouse gas 28 to 36 times more effective than carbon dioxide at trapping heat in the atmosphere over a 100-year period.

REUSE: Repair & Reuse

Repairable items make up just 2-5 percent of the waste stream, but their value is estimated to be as high as $550 per ton (2007 dollars). Repaired products hold significantly greater value than recovered materials.[16] By reframing repair as an act of care, the promotion of repair can adopt a broader value orientation that is likely to resonate with individuals. The development of a thriving repair economy relies on a willingness to adopt new consumption and ownership practices.[17]

Zero waste programs focus on reuse programs as a way to reinvest the value of discarded materials and products back into the local economy and to create jobs. According to research conducted by the Institute for Local Self-Reliance, reuse programs create almost 200 times as many jobs as landfilling and incinerating materials.[18]

The City will provide online directories, material exchanges, and direct assistance to promote reuse, rental, and repair businesses, including zero waste vendors and caterers; reuse organizations that recover materials, including bulky items, for reuse (such as the Habitat for Humanity ReStore at the San José Environmental Innovation Center); and repair fairs and fix-it clinics in neighborhood centers and libraries.

4,400
Annual Diversion Tons

15,200
Annual $MTCO_2e$ Reduced

Repair cafés and fix-it clinics are free events where people get together to fix their broken possessions. Visitors bring things they want fixed and work collaboratively with volunteers to repair them. When the volunteer repair work is coupled with teaching, visitors become more self-reliant and learn how to fix items instead of throwing them away and buying new ones.

Habitat ReStores are operated by local Habitat for Humanity organizations. ReStores accept donations and sell items to the public, thereby diverting reusable household items and building materials from area landfills.[19] These stores create multiple community benefits by creating and sustaining jobs, as well as giving new life to used items.

Recommended Actions	Short or Long term
Promote reuse, rental, and repair through online directories, material exchanges, and direct assistance.	S
Coordinate repair fairs and fix-it clinics in neighborhood centers and libraries.	S
Expand refill opportunities for residents and businesses.	S

16 Institute for Local Self-Reliance. 2022. "Repair, Reuse, and Economic Growth in America." Available at: https://ilsr.org/repair-reuse-and-economic-growth-in-america/.
17 Heather A. Rogers, Pauline Deutz, Tomás B. Ramos. 2021. "Repairing the circular economy: Public perception and participant profile of the repair economy in Hull, UK." Available at: https://doi.org/10.1016/j.resconrec.2021.105447.
18 Institute for Local Self-Reliance. 2021. "New Report from Global Anti-Incineration Alliance: Zero Waste Creates 200 Times More Jobs Than Landfills and Incinerators." Available at: https://ilsr.org/new-report-from-global-anti-incineration-alliance-zero-waste-creates-200-times-more-jobs-than-landfills-and-incinerators/.
19 Habitat for Humanity ReStore. 2023. Available at: https://www.habitat.org/restores.

RECYCLE / COMPOST: Construction & Demolition Recycling

The City's Construction & Demolition ordinance requires builders and permit holders to recycle 75 percent of materials from new construction and tenant improvements and 50 percent from alterations and demolitions. To support compliance, they must deliver C&D waste to City-certified facilities or use a City-authorized C&D hauler.

The C&D sector is a key focus for the City, as many of the materials that currently go to landfills are generated at construction sites, including self-haul loads.

The City will continue to examine the success of the current programs and identify improvements to align with current markets and zero waste strategies. The City will explore new incentives and/or mandates to promote resource recovery and increase diversion at C&D facilities, such as building deconstruction and use of refurbished and salvaged materials.

29,400 Annual Diversion Tons

80,800 Annual MTCO$_2$e Reduced

Recommended Actions	Short or Long term
Explore new incentives and/or mandates to help increase diversion at C&D facilities.	S
Based on findings, implement incentives and/or mandates to promote resource recovery at C&D facilities. Continue to explore opportunities to enhance the C&D program.	L

RECYCLE / COMPOST: Reduce Disposal of Compostable Materials in Landfills

The City will continue to implement programs to enter into SB 1383 compliance (see California State Laws), including monitoring and minimizing contamination of compostable materials at covered residences and businesses, conducting outreach to compostable materials generators about the requirements, applying for and utilizing grant funds to support data management and monitoring, coordinating a food recovery program, and purchasing organic materials such as compost.

This strategy aligns with other strategies to support SB 1383 implementation (see REUSE: Surplus Food Recovery and RETHINK / REDESIGN: Sustainable Purchasing Citywide).

57,600 Annual Diversion Tons

105,000 Annual MTCO$_2$e Reduced

Recommended Actions	Short or Long term
Continue to enforce SB 1383 requirements that minimize the disposal of compostable materials in landfills.	S

RECYCLE / COMPOST: Recycling Market Development

Placing materials in a recycling bin is just the first step in recycling. Those materials aren't truly recycled unless they have a market and become a source material for new products.

San José has one of the most comprehensive recycling programs in the nation. The City is designated as a Recycling Market Development Zone, a CalRecycle program that provides loans, technical assistance, and free product marketing to fuel new businesses that divert waste from landfills.[20] The City will continue to leverage this program to access funding and offer loans and incentives to manufacturers that use recycled feedstock.

1,100
Annual Diversion Tons

4,000
Annual MTCO$_2$e Reduced

Recommended Actions	Short or Long term
Support market and infrastructure development for recycling commodities and continue to leverage the City's Recycling Market Development Zone program.	L

MATERIALS RECOVERY: Technology for Higher Diversion

The City recognizes that even though residents and businesses strive to recycle and compost, some recoverable materials end up discarded in the garbage. The City's waste processing facilities are designed to sort and compost or recycle these materials. The City and its contractors will continue to pursue enhanced technology upgrades for processing discarded materials and recovering recyclable and compostable materials at local facilities, which will increase diversion across all City programs.

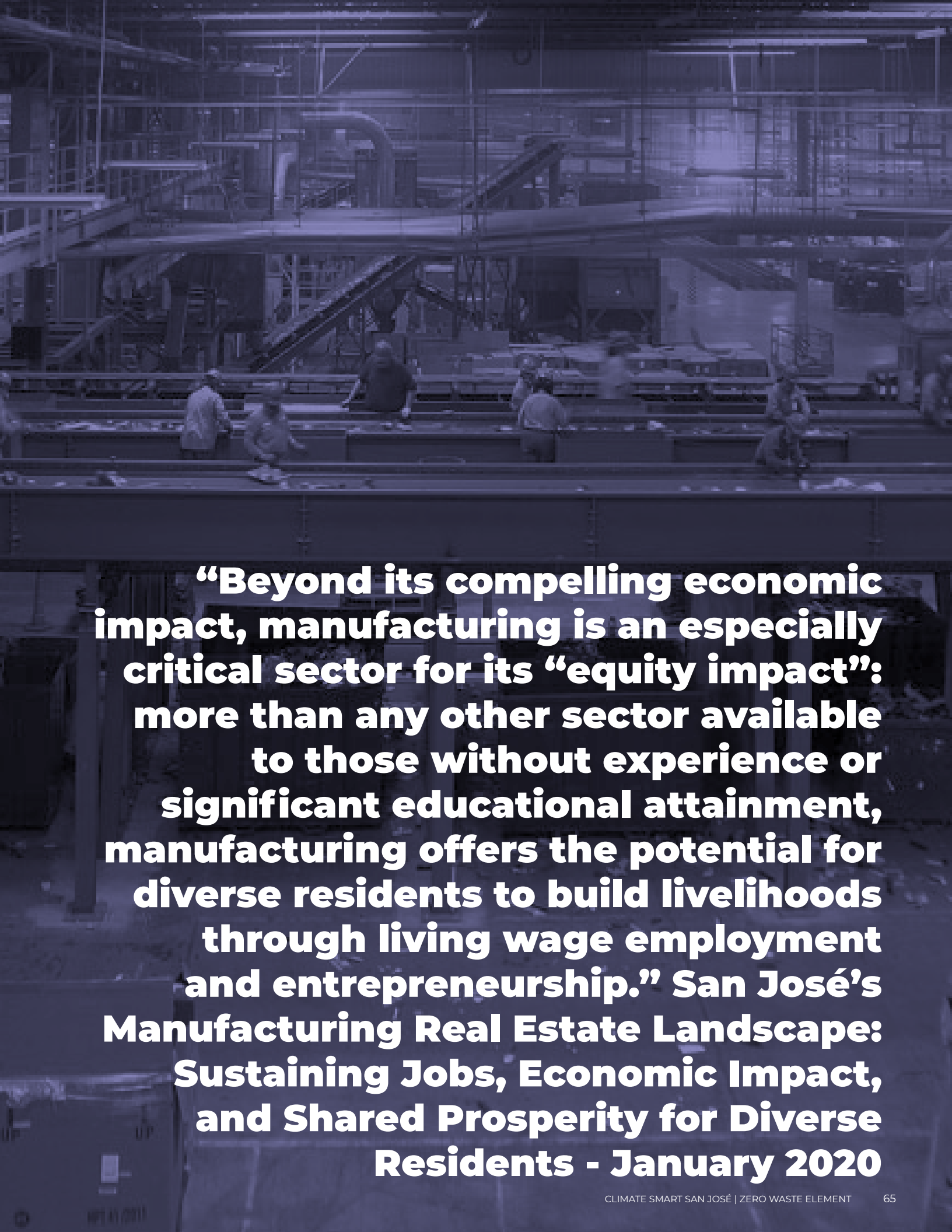
San José is unique in the amount of solid waste facility infrastructure located within city and county limits. Local waste processing aligns with the goals of Climate Smart San José by keeping the GHG emissions associated with transport of solid waste low, since waste does not have to be hauled over long distances for processing or disposal.

64,900
Annual Diversion Tons

123,400
Annual MTCO$_2$e Reduced

Recommended Actions	Short or Long term
Increase diversion by pursuing enhanced technology upgrades in the City's waste processing facilities.	L

20 CalRecycle. 2023. "Recycling Market Development Zone San José. Available at: https://www2.calrecycle.ca.gov/BizAssistance/RMDZ/Zones/Details/33



“Beyond its compelling economic impact, manufacturing is an especially critical sector for its “equity impact”: more than any other sector available to those without experience or significant educational attainment, manufacturing offers the potential for diverse residents to build livelihoods through living wage employment and entrepreneurship.” San José’s Manufacturing Real Estate Landscape: Sustaining Jobs, Economic Impact, and Shared Prosperity for Diverse Residents - January 2020

Metrics and Targets

The Zero Waste Element builds on the City's commitments to reduce waste generation, increase diversion, and reduce disposal. The City estimates that fully implementing the 13 strategies in this Element will significantly reduce waste generated per capita, waste landfilled, GHG emissions, and increase the City's diversion rate.

Vision

San José will implement a broad set of strategies to significantly reduce waste and increase diversion from landfill disposal while contributing to the City's goal of carbon neutrality by 2030.

Table 3. Projected Metrics and Progress Milestones

INDICATORS	PER CAPITA WASTE GENERATION	CITY PROGRAM DIVERSION PERCENTAGE	WASTE TO LANDFILL	CARBON EMISSIONS
METRICS	Tons of waste generated per person per year	Percentage of waste diverted from landfill across all City programs	Landfill disposal across all City programs	Emissions from these strategies

PROGRESS MILESTONES	Tons of waste per person per year	Percentage of waste diverted from landfill	Tons of waste sent to landfill per year	Metric tons of CO_2e emitted per year
2021	0.8	63%	315,000	248,000
2030	0.7	82%	157,000	124,000
2040	0.6	91%	78,500	62,000
2050	0.5	96%	31,400	25,000

The City maintains a dashboard to monitor progress on the implementation of Climate Smart. The Climate Smart Data Dashboard is publicly available on the City's website.[21]

21 City of San José. "Climate Smart Data Dashboard." Available at: https://www.sanjoseca.gov/your-government/departments-offices/environmental-services/climate-smart-san-jos/climate-smart-data-dashboard.

Future Zero Waste Solutions

The Zero Waste Element focuses on the strategies that San José will pursue to reduce waste, increase recycling and composting, and reduce GHG emissions. This corresponds with the City's carbon neutrality goal and the milestones of the C40 Advancing Toward Zero Waste Declaration.

The 13 strategies in this Element were chosen based on what is feasible to implement in the next ten years. Future zero waste programs could include:

- Widespread systems change for waste prevention through new technologies, behavior change campaigns, and increased research and development.
- Innovative aerobic biological processes like windrow composting, aerated static pile composting, and black soldier fly processing.
- Improved anaerobic biological processes through emerging pre-digestion technologies.
- New and emerging technologies to increase the recycling rates of hard-to-recycle materials like solar panels, electric car batteries, and refrigerants.
- Conversion technologies like gasification.

04 Resident and Business Zero Waste Playbooks

Overview

Achieving zero waste will require action across San José's communities, including from residents and businesses. The Resident Playbook on Zero Waste and Business Playbook on Zero Waste that follow list key steps that residents and businesses can take to conserve resources and prevent waste from reaching landfill.

Resident Playbook on Zero Waste

Become a zero-waste advocate. Check all the boxes.

For San José to achieve zero waste, everyone needs to do their part. Here's how residents can participate. Visit the Climate Smart Challenge platform at climatesmartsjchallenge.org for more information, ideas, and local resources.

❑ **Sign up for a Climate Smart GoGreen Team**

Climate Smart GoGreen Teams are a fun, easy way to connect with friends or neighbors, learn about sustainability and resilience, and take actions that make a difference. No experience or preparation required!

Together, you will learn how to reduce your carbon footprint, live healthier, save money, get prepared for disasters, and have a lot of fun along the way. Visit SJEnvironment.org/GoGreenTeams for more information.

Impact: Improve community resilience; reduce waste and ultimately help reduce GHG emissions.

❑ **Recycle Right and reduce contamination (no food, no wish-cycling)**

WISH-CYCLING (verb)

Putting non-recyclable materials in the recycling bin with the hope that they will be recycled, which leads to higher contamination rates in the recycling stream.

Impact: Better for environment, cleaner materials stream; ensure other recyclables aren't contaminated; encourage proper disposal of difficult items; reduce pollution; reduce landfill use; creates jobs; can ultimately help reduce residential recycling costs.

❑ **Buy less, buy used or borrow, rent instead of buy**

Use what you already have before purchasing new and share with your neighbors.

Shop reused and donate unwanted items; join an online Buy Nothing group; host a clothing swap, baby equipment swap, or free little library. Buy items intended to last (for example, sturdy and timeless clothing instead of trendy items).

Impact: Save money; allow others to reuse items still in good condition; reduce waste.

❑ Repair broken items

Find ways to repair broken items; take items to repair shops; attend a fix-it clinic; support tool lending libraries; use online resources like YouTube videos to learn. Fix-it clinics are public events in which experts in repair and reuse guide residents to learn new skills (like sewing on a button, changing a cell phone battery, or repairing bikes and electronics).

Impact: Source reduction; save money by repairing and reusing.

❑ Bring your own

Use reusable bags when shopping; pack a zero-waste lunch (with a reusable lunch box, water bottle, utensils, and napkin).

Bring your own container for leftovers at a restaurant or potluck; keep reusable utensils and straws in your purse, backpack, or glove compartment. Bring your own mug or reusable bottle for beverages.

Impact: Reduce single use plastics to keep our waterways clean, protect wildlife, and reduce blight.

❑ Find out how to recycle "hard-to-recycle" items

Some things can't go in the curbside bin but can still be recycled. Learn how to Recycle Right by visiting SanJoseRecycles.org. Learn how to dispose of household hazardous waste by visiting HHW.org.

Impact: Save money and the environment too!

❑ Notice and prevent food waste

Keep an eye on the food scraps your household creates. Take an inventory of food at home before shopping. Plan meals in advance. Refrigerate or freeze leftovers in clear containers with labels. Preserve extra fruits and vegetables by freezing, pickling, canning, dehydrating, or making jam.

Impact: Save money; provide food to those in need; reduce waste.

❑ Go paperless

Avoid printing; use digital methods for storing, managing, and sharing documents and communications.

Impact: Better for the environment, help reduce GHG emissions associated with paper fiber.

❑ Eat less meat

Eat less meat to reduce greenhouse gas emissions and conserve resources. Livestock produce methane during digestion and meat production involves significant energy and resource use.

Impact: Better for the environment, help reduce GHG emissions associated with meat production.

❑ Compost at home or find a local compost program

Compost food scraps to generate healthy soil for your garden and reduce the amount of material you throw in your garbage container. Home compost workshops are available for residents. Or find a local composting program that will accept your food scraps.

Impact: Higher and better use of compostable materials, compost has more nutrients and is beneficial for home gardens; can ultimately help reduce residential garbage costs.

Business Playbook on Zero Waste

Businesses lead the way to zero waste! Most strategies save money and the environment too.

For San José to achieve zero waste, everyone needs to do their part. Here's how businesses can participate.

❑ Donate food and track food waste

Recover edible food and work with food recovery organizations to collect and redistribute food to insecure community members.

Impact: Potentially reduce food purchasing and disposal costs, divert food waste from landfill, and provide unsold items to those in need.

❑ Purchase environmentally preferred products and packaging

Use products with recycled content, non-toxic products, recyclable or compostable products, and use reusable foodware in restaurants.

Impact: Increase recyclability of used products and decrease waste generated.

❑ Avoid single-use food service ware and packaging

Invest in reusable silverware that will last years. Invest in a dishwasher to clean reusable foodware.

Impact: Reduce costs and prevent tons of waste from going into landfills.

❑ Implement business recycling programs

Address hard-to-recycle items, including batteries.

Encourage good recycling practices, make it fun, and offer contests and challenges for employees.

Use technology to reduce waste: Applications (e.g., LeanPath) for food waste reduction, sensors on dumpsters to monitor waste generated/collected.

Conduct a simple waste audit to see what's in the waste stream and how to reduce it.

Impact: Support companywide culture change, team building, and employee satisfaction.

❑ Prepare your loads to maximize recovery at construction sites

It is not necessary to have multiple containers on site. Instead, containers can be matched to each phase of the job and swapped in or out.

- When the framers are working, it's time for a wood box.
- When the wiring, plumbing, and appliances are being installed, it's time for a metal box.
- When gypsum drywall is being installed, it's time for a drywall box.
- If you've planned the job well from the construction side, you've already done most of the work required to recycle.

Impact: Source separation enhances value, reduces costs, of processing, and makes compliance easier to document.


6W83242

05 Technical Appendix

A-1 Key California Waste Legislation

Short-Lived Climate Pollutant Reduction (SB 1383)

SB 1383, or the Short-Lived Climate Pollutants bill, sets to reduce statewide methane emissions by 40-percent by targeting two sectors: 1) dairy and livestock manure, and 2) organic waste landfill disposal. This goal mandates a 50-percent reduction in organic waste disposal by 2020 and 75-percent reduction by 2025. CalRecycle (California's Department of Resources Recycling and Recovery), the state's waste authority, adopted formal regulations in November 2022 to outline steps they deemed necessary to achieve these goals. These supporting requirements span across several disciplines within the waste sector and include, but are not limited to, the following:

- Organic Waste Collection Services
- Public Education and Outreach
- Generators of Organic Waste
- Regulation of Waste Haulers
- Edible Food Recovery Programs
- Capacity Planning
- Recovered Organic Waste Products Procurement
- Reporting and Enforcement

For the purposes of this analysis, the primary focus is on the City's ability to achieve the targeted organic waste diversion goals in a sustainable, economical, and practical manner. While there are several factors that play a role in achieving this goal, SB 1383's Article 3, Organic Waste Collection Services and Article 12, Procurement of Recovered Organic Waste Products are instrumental in understanding key requirements the City is subject to.

Article 3. Organic Waste Collection Services

SB 1383 outlines three approved waste collection methods:

Three-container Waste Collection Services

In this waste collection system, there is a designated container for each waste type: a green bin for organic waste, blue bin for non-organic recyclables, and a gray bin for non-organic, non-recyclable solid waste. The containers may be completely separate, or split (e.g., one container split for recyclables and solid waste materials). This collection system also allows for additional containers

for increased recovery, such as use of a fourth brown container for food waste. Jurisdictions that use the three-bin system may allow organics to be co-collected in the gray bin (e.g., solid waste bin) if the gray bin is received at a High Diversion Organic Waste Processing Facility. If residents are instructed to throw all organic waste, such as food waste, in the green bin then the jurisdiction is not required to use a "High Diversion Organic Waste Processing Facility". This is one key advantage with using a three-container collection system.

A "High Diversion Organic Waste Processing Facility" is a facility that achieves 50-percent or greater recovery of its organic waste fraction by January 1, 2022, and then 75-percent or greater recovery by January 1, 2025. For example, if a facility determines its annual organic waste fraction is 10,000 TPY, it must achieve at least 5,000 TPY recovery by 2022, then 7,500 TPY by 2025 to be eligible for this classification. If the facility fails to meet this recovery rate for two consecutive quarters, then the facility is no longer considered to be achieving high diversion causing the jurisdictions that rely on this facility to be in violation of these regulations.

Two-container Waste Collection Services

The two-container system outlines two possible combinations: 1) an organic waste green bin and a non-organic waste grey bin, or 2) a non-organic recyclables blue bin and a grey bin for solid waste and co-collected organic waste. For both of these combinations, the grey bin must be sent to a High Diversion Organic Waste Processing Facility since this collection method allows for the intentional comingling of both organic and non-organic wastes.

Unsegregated Single-Container Waste Collection Services

This collection system uses a single grey container to collect all wastes, organics, recyclables, and non-organic, non-recyclable solid waste. This container must be sent to a High Diversion Organic Waste Processing Facility.

Article 12. Procurement of Recovered Organic Waste Products

Starting January 1, 2022, all jurisdictions were required to procure annually a quantity of recovered organic waste products to meet their annual procurement target, which has been established at 0.08 tons of organic waste per resident per year. Eligible products include: compost, renewable gas, electricity from biomass conversion, and mulch, however each has specific restrictions:

- Compost must be produced at a permitted facility, and may include digestate from anaerobic digestion (AD) facilities but the digestate must be aerobically composted.

- To be eligible, renewable gas must be generated from organic waste, however wastewater treatment plants do not count. This targets the renewable gas generated from AD facilities. The renewable gas can be used as a transportation fuel, for electricity, or for heat.
- Biomass conversion facilities are specifically called out as qualifying sources of electricity.
- Mulch product also has specific restrictions, such as mulch only qualifies if the jurisdiction has an enforceable ordinance to require mulch producers comply with the physical contamination, maximum metal concentration, and pathogen density standards for land application.

The organic waste product procurement target is based on January 1, 2021 population estimates reported by the California Department of Finance and the targets are in effect from January 1, 2022 through December 31, 2026. Using these estimates, the City with a population of 1,029,782 is required to procure 82, 383 tons of recovered organic waste products made from California, landfill-diverted organic waste per year, beginning January 1, 2022. The summary below shows the quantities if the City were to satisfy the procurement target using 100 percent of one eligible product type, however the City is allowed to mix-and-match the products to reach the procurement target.

Compost	Electricity from Biomass Conversion
Renewable Gas	Mulch

City of San José Procurement Targets

- Compost: 47,782 tons
- Renewable Gas:
  - 1,730,034 diesel gallon equivalents, OR
  - 19,936,580kilowatt-hours of electricity, OR
  - 1,812,416 therms for heating
- Electricity from Biomass Conversion: 53,548,664 kilowatt-hours
- Mulch: 82,383 tons

In October 2022, Governor Newsom signed into law, AB 1985, thereby establishing a phase-in period for jurisdictions to comply with the recovered organic waste product procurement requirements of SB 1383, with full compliance required by January 1, 2025 (30 percent of procurement target by January 1, 2023, 65 percent by January 1, 2024 and 100 percent by January 1, 2025).

AB 2346 was signed into law in September 2024 and aims to provide more flexibility for jurisdictions in how they meet their recovered organic waste product procurement targets under SB 1383. The AB 2346 statute is effective January 1, 2025 and expands the types of products that are eligible for procurement credit, authorizes local jurisdictions to invest in specified activities related to organic material recycling in lieu of procuring recovered organics, and making other changes to the calculations used to establish procurement credits and targets.

Mandatory Commercial Organics Recycling (AB 1826)

Under AB 1826, also known as the mandatory commercial organics recycling mandate, jurisdictions are required to implement organic waste recycling programs for their commercial entities. Specifically, business, including multifamily residential dwellings (MFDs) with five or more units, were required to arrange organic waste recycling services beginning on January 1, 2016. The jurisdictions' programs are expected to include conducting outreach, educating businesses on how to recycle organic waste in the jurisdiction, and monitoring to identify businesses not recycling and inform them of the law and how to recycle organic waste. Beginning August 1, 2017, jurisdictions were to include information about their organic waste recycling program implementation in the annual report submitted to CalRecycle.

The requirements for the businesses themselves are phased according to the amount of waste the business generates per week. Organic waste recycling services were required to be arranged according to the following thresholds and implementation schedule:

- **By April 1, 2016:** Businesses that generate eight cubic yards of organic waste per week
- **By January 1, 2017:** Businesses that generate four cubic yards of organic waste per week
- **By January 1, 2019:** Businesses that generate four cubic yards or more of commercial solid waste per week
- **By July 1, 2020:** AB 341 and AB 1826 covered businesses must provide organics and recycling containers at front-of-house to collect waste generated from customers and/or residents
- **By Summer/Fall 2021:** If CalRecycle determines that the statewide disposal of organic waste in 2020 has not been reduced by 50 percent of the level of disposal during 2014:
  - → Thresholds will be lowered to businesses that generate two cubic yards or more of commercial solid waste per week, and
  - → Certain exemptions may no longer be available.

In September 2020, CalRecycle made the determination that the AB 1826 threshold needed to be lowered to regulate

businesses and MFDs with 5 or more units that generate two or more cubic yards per week of solid waste, recyclables, and organics.

This bill came into effect prior to SB 1383, and helped pave the way for introducing organic waste recycling services. At the time, many haulers decided to implement a third container to their commercial accounts in part to not impact the existing “grey” and “blue” containers and in part to ensure maximum program flexibility. This phased approach allowed haulers to transition their commercial customers gradually into a three-container system which helped to manage overall program costs specifically with regards to public outreach and education.

Plastic Pollution Prevention and Packaging Producer Responsibility Act (SB 54)

SB 54, the Plastic Pollution Prevention and Packaging Producer Responsibility Act, was signed into law in 2022. SB 54 aims to shift the responsibility for plastic pollution and packaging waste from local jurisdictions to producers. The goals of SB 54 are as follows:

- 100% of single-use packaging and single-use plastic foodware will be recyclable or compostable by 2032
- 65% of single-use plastic packaging and single-use plastic foodware will be recycled by 2032 (with interim targets of 30% recycled by 2028 and 40% recycled by 2030)
- 25% of single-use plastic packaging and single-use plastic foodware will be sourced reduced by both weight and units by 2032 (with interim targets of 10% source reduced by 2027 and 20% source reduced by 2030)
- 10% source reduction must come from shifting to reusable or refillable product types, or from eliminating a plastic component from products by 2032 (interim targets of 2% source reduction from reuse or refill by 2027 and 4% source reduction from reuse or refill by 2030)

These goals must be met by the producers of covered materials (single-use packaging and single-use plastic foodware) as a group, not by each producer individually. Therefore, some producers may achieve minimal source reduction, while other producers may achieve greater than 25% source reduction. The law also bans the use of expanded polystyrene foodware in California unless producers are able to demonstrate that expanded polystyrene meets specified recycling rates, beginning with a 25% recycling rate in 2025 and increasing until 2032, when the material would need to meet a 65% recycling rate.

In order to accomplish the goals set forth in SB 54, producers are required to join a Producer Responsibility Organization (PRO); any producers who are not part of the PRO must submit documentation to CalRecycle to become Independent Producers and fulfill their obligations under SB 54. Producers must pay fees to the PRO, the amount of which varies

by producer, depending on the amount and types of covered material that a producer creates or distributes. The PRO, in turn, must use part of these fees to pay the costs that local jurisdictions and local recycling service providers incur when collecting, transporting, and processing covered material, as well as the cost to educate the public about proper sorting of covered material. This payment mechanism is the implementation of the fundamental purpose of SB 54— to shift responsibility from local jurisdictions to producers of covered material.

Alongside the payment mechanism that SB 54 creates, the law also requires covered material to be processed and recycled at responsible end markets. It establishes documentation requirements that producers and the PRO must fulfill, to be clarified through the rulemaking process, to ensure that material is sent to responsible end markets; the PRO is also required to make investments to create responsible end markets if they do not already exist.

Additionally, SB 54 created a new fund, the Plastic Pollution Mitigation Fund, in the State Treasury. From 2027-2037, at least $500 million of the fees collected by the PRO must be deposited into this fund each year. The PRO may collect up to $150 million of this amount from plastic resin manufacturers who sell plastic covered material to producers who are participants in the PRO. 60% of the fund must be used to reduce the historical and current public health and environmental justice impacts of plastics. The other 40% must be used to monitor and reduce the environmental impacts of plastics on ecosystems and human health (50% of this part of the money is also required to benefit residents in disadvantaged or low-income communities).

SB 54 also created an Advisory Board with 13 voting members to review the PRO Plan and Budget (which must be submitted to the Board by April 2026) and advise CalRecycle on the proposed regulations, among other duties. Two voting member seats are reserved for representatives of environmental justice communities. One of these seats is reserved for a representative of an environmental justice organization, and the other seat is reserved for a representative of a disadvantaged or low-income community or rural area. The inaugural members of the Advisory Board were chosen in 2023, and the Advisory Board began meeting to fulfill their statutory obligations in February 2024.

SB 54 requires CalRecycle to conduct a needs assessment on items related to the implementation of SB 54. The components of the needs assessment are a Source Reduction Baseline Study; a Collection, Processing, & End Markets Study; a Source Reduction & Materials Design Study; a Consumer Education and Access Study; and a Current & Needed Statutory Funding Provisions Study. The needs assessment must be complete before the PRO can create their Plan and Budget (which must be approved by CalRecycle by January 1, 2027). Administrative costs that CalRecycle incurs to implement SB 54, such as costs associated with the needs assessment, must be reimbursed by the PRO.

Since one of the requirements set forth in SB 54 is that single-use packaging and single-use plastic foodware must be recyclable or compostable by 2032, the law requires local jurisdictions to collect and divert from landfill covered materials that CalRecycle determines are recyclable or compostable.

Jurisdictions that cannot collect a material for specified reasons can apply for an exemption through CalRecycle.

The definitions for "recyclable" and "compostable" were established in California law in 2021; these definitions are used in SB 54 as well, to ensure consistency across materials' life cycles. Recyclability is defined within SB 343, which limits the use of chasing arrows and regulates recyclability claims beginning in July 2025. In order to be considered recyclable, materials must be collected by recycling programs that cover at least 60% of the state's population and accepted for sorting into defined streams at facilities that serve at least 60% of California's recycling programs.

Compostability is defined in AB 1200 and AB 1201. Compostable materials must meet ASTM standards, be free of PFAS, distinguishable from non-compostable products, designed to be "associated with the recovery of desirable organic wastes," and accepted for use in the National Organic Program, a federal program that develops standards for organic agriculture, beginning in January 2026.

The list of Covered Material Categories that meet these criteria was first published in December 2023 and updated in July 2024. The list must be updated annually by CalRecycle, beginning in 2025. As of December 2023, CalRecycle considers all bioplastics to be neither compostable nor recyclable, though this could change through future updates.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A-2 Bay Area Basin-Wide Methane Strategy

Bay Area Basin-Wide Methane Strategy

Methane represents the second largest type of GHG emissions in the region and accounts for about 10 percent of the Bay Area's GHG inventory. Additionally, methane is a potent and short-lived GHG, with a 20-year Global Warming Potential (GWP) of 86 and an atmospheric half-life (average lifespan) of 12 years (compared to 20 to 200 years for CO_2).[1] Due to these factors, the Bay Area Air Quality Management District (BAAQMD) is targeting reductions in methane emissions paired with its ongoing efforts to reduce CO_2 emissions to address long-term climate stability. Reducing methane emissions would also provide the co-benefit of reducing emissions of associated co-pollutants, which can include key climate, criteria, and toxic pollutants, resulting in added climate benefits and improvements to public health.

The Basin-Wide Methane Strategy is a control measure within BAAQMD's 2017 Clean Air Plan that aims to better quantify and reduce emissions of methane, and its co-pollutants, from all stationary and area sources throughout BAAQMD's jurisdiction, by implementing a coordinated strategy that combines research, rulemaking, collaborations with state agencies, and other programs.[2]

This strategy was developed and will be implemented to reduce the region's methane emissions in support of the California Air Resource Board's (CARB's) methane reduction goals (40 – 45 percent below current levels by 2030).

Elements of this strategy include:

- Intensifying efforts to improve BAAQMD's methane emissions inventory
- Considering amendments to existing BAAQMD Regulation 8 Rule 2: Miscellaneous Operations (Regulation 8-2) to prohibit significant methane leaks throughout the district
- Collaborating with state agencies on their methane rules under development
- Identifying cost effective and technically feasible methane emissions reduction opportunities throughout the Bay Area

1 Bay Area Air Quality Management District (BAAQMD), 2018. DRAFT Regulation 13: Climate Pollutants, Rule 1: Significant Methane Releases. September 2018. Available at https://www.baaqmd.gov/~/media/dotgov/files/rules/regulation-13-rule-1/documents/20180913_wr_1301-pdf.pdf?la=en. Accessed December 2020.

2 Bay Area Air Quality Management District (BAAQMD), 2017. Spare the Air, Cool the Climate, A Blueprint for Clean Air and Climate Protection in the Bay Area – Final 2017 Clean Air Plan. April 19, 2017. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed December 2020.

- Considering the removal of methane exemptions from existing BAAQMD rules when appropriate

As part of identifying methane reduction opportunities in the solid waste sector BAAQMD has taken leadership in a regulatory structure to limit GHG emissions including methane. The BAAQMD Regulation 13 series proposed rules are the first attempts by a regional air district to move beyond regulating criteria air pollutants and toxic air contaminants and into driving GHG reductions. Additionally, BAAQMD has proposed amendments to the existing BAAQMD landfill rule (Regulation 8 Rule 34: Solid Waste Disposal Sites) with stricter control and fugitive leak standards and will evaluate if methane emissions from facilities currently exempt from this rule warrant regulation. In addition, BAAQMD proposed new regulations, specifically Regulation 13 Rule 1: Significant Methane Releases (Regulation 13-1); Regulation 13 Rule 2: Organic Materials Handling Operations (Regulation 13-2); and Regulation 13 Rule 3: Composting Operations (Regulation 13-3), to reduce methane emissions from facilities that were previously not regulated. Currently, there are no BAAQMD rules specifically designed to address large releases of methane. The implications and challenges of these rules on solid waste handling and disposal facilities are discussed below.

Amendment to Regulation 8, Rule 34: Solid Waste Disposal Sites

Current Regulation

Generally, there are three levels of regulatory authority governing air quality and GHG emissions from landfills: federal, state, and local. Each tier of regulation has different requirements and different levels of stringency that are imposed in order to control emissions. At the local level, BAAQMD Regulation 8 Rule 34: Solid Waste Disposal Sites (Regulation 8-34) adopted in May of 1984, regulates emissions of both methane and non-methane organic compounds from landfill surfaces and landfill gas collection and control systems. It also sets a minimum destruction efficiency for landfill gas control systems and energy recovery devices.[3] The regulation has been amended and updated to align with updates made to the federal requirements and EPA's updated New Source Performance Standards and Emissions Guidelines. Through a Memorandum of Understanding with the State, BAAQMD enforces both Regulation 8-34 and CARB's Landfill Methane Regulation.

Purpose of the Amendment

Based on emissions research and analysis, the BAAQMD has determined that landfills are the single largest source of methane in the Bay Area, generating emissions 1.3-2.3 times greater than current emissions inventory numbers reflect.[4] As part of an amendment to Regulation 8-34, BAAQMD is prioritizing regulatory efforts to control emissions of methane and non-methane volatile organic compounds from solid waste disposal facilities and to improve the level of compliance for all facilities accepting and disposing of solid waste.

3 Bay Area Air Quality Management District (BAAQMD), 2005. Regulation 8: Organic Compounds, Rule 34: Solid Waste Disposal Sites. June 15, 2005; revised April 24, 2018. Available at https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-34-solid-waste-disposal-sites/documents/rg0834.pdf?la=en. Accessed December 2020.

4 Bay Area Air Quality Management District (BAAQMD), 2019. Regulation 8: Organic Compounds, Rule 34: Solid Waste Disposal Sites Concept Paper. May 2019. Available at https://www.baaqmd.gov/~/media/dotgov/files/rules/regulation-8-rule-34/documents/20190606_cp_0834-pdf.pdf?la=en. Accessed December 2020.

Requirements

The amendment process will be implemented in two phases.

- Phase 1 amendments to Regulation 8-34 are envisioned to include:
  - → Coordination and alignment with current State and federal regulations, and
  - → Best management practices that will reliably reduce methane emissions.
- Phase 2 of amendments would occur subsequently, as ongoing and future research produces new findings to inform best practices and emissions controls

Draft amendments to Regulation 8-34 would impact all solid waste disposal sites above a threshold amount of waste in place.[5] The "bright line" threshold is still under consideration. Regulation 8-34 currently applies to landfills with one million tons of decomposable solid waste in place. Potential updates would primarily focus on active landfills, since permanently closed landfills generate a declining volume of landfill gas over time. Though language for the draft rule is currently in the early stages, the draft amendments will include best management practices that would address areas such as implementing more rigorous monitoring; inspection and maintenance programs; regulating breakdown events; energy recovery device best practices; daily, intermediate and final covers; and working face management. BAAQMD will also examine the existing state and federal regulations to identify areas where requirements can feasibly be made more effective, practical, and restrictive.

Anticipated Challenges to the City

When adopted, implementation of the amended Regulation 8-34 would likely add more rigorous monitoring, inspection and maintenance requirements which would require additional equipment and personnel. It is likely that there will be specific requirements and procedures that will need to be implemented on a daily basis in addition to more frequent reporting requirements. These more rigorous and more frequent compliance requirements will require capital expenditures and additional labor resources to implement. Additional challenges may become apparent once the BAAQMD has progressed further with the rule amendment. These requirements are expected to have a moderate to significant impact on the City budget.

5 Bay Area Air Quality Management District (BAAQMD), 2019. Regulation 8: Organic Compounds, Rule 34: Solid Waste Disposal Sites Concept Paper. May 2019. Available at https://www.baaqmd.gov/~/media/dotgov/files/rules/regulation-8-rule-34/documents/20190606_cp_0834-pdf.pdf?la=en. Accessed December 2020.

Proposed New Regulation 13, Rule 1: Significant Methane Releases

Purpose of the Rule

The purpose of Regulation 13-1 is to limit significant methane emissions from all regulated sources throughout BAAQMD's jurisdiction. If sources are subject to more stringent methane emission requirements in amendments to Regulation 8 they may receive exemptions from subsequent source-specific Regulation 13 Rules that are being proposed to address methane emissions from specific operations. As mentioned above, currently, there is no BAAQMD rule specifically designed to address and restrict large releases of methane. BAAQMD Regulation 8-2 prohibits releases of organic compounds that exceed 15 lbs./day (and a concentration of 300 parts per million - ppm) throughout the region but methane and natural gas are excluded from that prohibition. BAAQMD Regulation 7: Odorous Substances addresses odor complaints while Regulation 1, Section 1-301 addresses public nuisances which occur as a result of a significant methane release, especially when a release of odorized methane occurs near a populated area. Regulation 13-1 targets significant methane releases even if they do not present an odor or public nuisance and seeks to establish a concentration threshold (in ppm) above which methane releases would be prohibited in the region. This limit would apply to all BAAQMD-regulated stationary sources, including methane leaks from landfills, natural gas facilities, refineries, wastewater treatment operations, bulk plants and bulk terminals.

Requirements

Draft Regulation 13-1 establishes a limit of 10,000 ppm above which methane releases must be controlled. This limit would apply to all BAAQMD-regulated stationary sources including landfills. Draft Regulation 13-1 covers both unplanned

and planned significant methane releases, including those that result from maintenance or repair operations. Unplanned significant releases are an emission of a gas or product containing methane from a leak, rupture or similar event whereas planned releases include expected or anticipated venting of a gas or product containing methane as a result of maintenance, inspection, safety protocols or repair of equipment.

When a significant methane release is detected, the facility owner/operator shall be required to minimize the release as soon as possible and no later than 72 hours from initial detection of the release. Additionally, the owner/operator must abate or repair the release to less than 500 ppm within 14 calendar days of initial detection of the release or notification of the release by the Air Pollution Control Officer (APCO). A second significant methane release from the same source will be required to be abated or repaired within seven calendar days of detection or notification of the release by the APCO. A source with a significant methane release for a third time shall be shut down within seven calendar days of detection or notification of the release by the APCO and shall be replaced prior to re-commencing operation.

Anticipated Challenges to the City

Implementation of this rule would affect all landfills and add significant measurement, monitoring, and record keeping responsibilities to the City landfill operators. Landfill operators subject to this rule will be required to use a portable methane gas detector that is capable of measuring concentrations as low as 10,000 ppm, with a maximum error of ±10 percent to detect a significant methane release.

Draft Regulation 13-1 would allow the use of a variety of technologies to detect and quantify methane releases, provided the equipment meets stipulated parameters in Regulation 13-1. For detection, Regulation 13-1 would allow any methane screening detection device demonstrated to be capable of measuring concentrations of at least 10,000 ppm, such as certain Forward Looking Infrared cameras. For compliance with abatement standards, laser equipment or handheld combustible gas indicators capable of measuring methane concentrations of at least 100 ppm are recommended.[6] All detectors must be approved by BAAQMD to measure methane releases prior to their use for compliance with draft Regulation 13-1. BAAQMD staff is developing methods to measure the methane concentration of a release.

The Rule also includes specifics of monitoring and record keeping requirements following a significant release and provides procedures to estimate concentrations and mass emissions. Draft Regulation 13-1 does not require monitoring for methane releases through a formal Leak Detection and Reporting (LDAR) program prior to the initial detection of a significant

6 Bay Area Air Quality Management District (BAAQMD), 2018. Draft Regulation 13: Climate Pollutants, Rule 1: Significant Methane Releases. August 28, 2018; revised September 13, 2018. Available at https://www.baaqmd.gov/~/media/dotgov/files/rules/regulation-13-rule-1/documents/20180913_dr_1301-pdf.pdf?la=en. Accessed December 2020.

release; however, facilities that are already required by State or federal regulations to monitor for methane leaks will detect significant methane emissions, and thus, abate them in accordance with the proposed requirements of draft Regulation 13-1. Facilities may also become aware of an unplanned significant release via process upset indicators or odor complaints from the general public. Some facilities or operations are already monitoring for methane at different frequencies per existing federal, State or Air District rules. Currently, methane emissions from solid waste disposal sites are required to be monitored under Regulation 8-34.

The costs to abate methane releases would vary widely depending on the type of source and nature of the release. There are four types of costs to consider: 1) the cost for technology to initially detect potential releases, to monitor each release during the abatement process and to detect recurring releases; 2) the cost to determine mass emissions; 3) the cost to minimize and ultimately abate the releases; and 4) the cost for staff time to maintain logs and implement appropriate recordkeeping. In many cases, facilities already own and operate methane detection devices. Because draft Regulation 13-1 would not require an LDAR program for the initial detection of a significant leak, implementation of this rule would add costs to owners or operators that do not currently own methane detection devices to rent or purchase devices. Those that already own equipment would have to perform an analysis to ensure the equipment meets the new regulatory requirements. There could also be additional costs to hire a contractor to survey the facility for releases and determine mass emissions from the release. Additional costs will be associated with abatement, including any replacement of parts and labor and subsequent monitoring to ensure abatement.


CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

A-3 10-Year Waste Management Plan Options

Expand City Role in Promulgating Waste Prevention and Diversion Programs

Why Focus on City Government?

It can be easier for a government to enforce zero waste compliance on its constituents, rather than on itself, so why focus internally? The City of San José's impressive zero waste leadership within its own departments[7] improves the City's performance directly, by reducing its own disposal tonnage, and even more importantly, indirectly, through several mechanisms:

- By investing in consistent infrastructure and behavior within its own departments, San José multiplies the breadth and effectiveness of its outreach, troubleshooting, and enforcement for the community at large. For example, a fire department is more likely to request "no disposables" for its annual holiday party catering order, and to provide positive and compelling messaging on the issue if their own fire stations rigorously follow a reusable dishware policy. Conversely, a City building inspector may be less effective in noticing and promoting deconstruction opportunities at a construction site if their own buildings' remodel was not optimized in this regard.
- Procurement policies that focus on waste minimization provide an avenue for circular-economy innovators to overcome barriers to entry into the marketplace.
- By harnessing its ability to fill infrastructure gaps and provide publicity, the City further levels a playing field that is often tilted in favor of a linear, consumption-based economy.

To expand internal participation in Zero Waste practices, the City can draw on the same techniques used to expand community participation:

7 https://www.sanJoseca.gov/home/showpublisheddocument?id=21999

- Engagement with employees in setting goals and strategies for achievement
- Publicity and education
- Technical and financial assistance with logistics and infrastructure
- Monitoring performance
- Evaluating, troubleshooting, celebrating successes, sharing best practices

One indicator of meaningful progress in adopting Zero Waste practices is the inclusion of Zero Waste expectations and protocols in hiring, onboarding, and training manuals for all City positions and departments.

Below are some opportunities for the City of San José to expand its valuable internal leadership in striving for zero waste.

Source Reduction and Reuse

Programs like those in the following examples could either be provided by the City or supported and advertised by the City.

Reduction of Food Waste

With the implementation of AB 1826, Mandatory Commercial Recycling, several public-private partnerships sprouted to rescue edible food and provide this resource to communities and individuals in need.

Waste Not OC is a food rescue network comprised of multiple public and private partners all with the same goal of preventing edible food from being thrown in the waste bin. This organization partners with restaurants, grocery stores, public and private schools, and hospitals to recover food and provide it to the local food bank or kitchens geared towards food rescue. Their food recovery model relies heavily on outreach to educate food waste generators on food rescue and connecting them with the appropriate partners.

- Food Rescue
- Public-Private Partnerships
- Mobile Apps for Reducing Food Waste

Fix-it/Repair Clinics

The Bay Area has several groups that coordinate local fix-it/repair clinics. Fixit Clinic organizes pop-up events in various locations around the Bay Area where people can bring broken items and receive coaching on how to fix them themselves. Upcoming events are generally posted on their Facebook page. Due to the pandemic, repair assistance has gone virtual, and is now offered through Zoom meetings and an online forum where people can crowdsource guidance from around the world on how to repair items.[8] Other nearby resources are the Repair Café Silicon Valley[9] and Maker Nexus, a community makerspace located in Sunnyvale[10].

There are several volunteer-run bicycle repair clinics in San José, such as the San José Bike Clinic, which is a fiscally sponsored

8 Fixit Clinic. "Joining Zoom Fixit Clinics or the Global Fixers Discord Server." Posted January 9, 2021. Accessible at https://fixitclinic.blogspot.com. Accessed January 19, 2021.
9 Repair Café Silicon Valley. Available at https://www.repaircafesv.org. Accessed November 26, 2024.
10 Maker Nexus. Available at https://makernexus.org. Accessed November 26, 2024

project of the Silicon Valley Bicycle Coalition,[11] and the free repair clinics offered by Good Karma Bikes, a nonprofit social enterprise full-service bike shop.[12] These spaces provide the tools, equipment, and education to teach residents how to build, repair, and maintain their bicycles.

HazMat Reuse Programs

A good living example of a hazardous waste material reuse program is that of the City of Thousand Oaks. This program collects usable household products and makes them available for free to the public. This has two major benefits: less hazardous materials to disposal and cost savings for residents instead of purchasing new products. Residents simply drop-off their partially used materials, and the City stores these materials in a hazardous waste storage locker, complete with spill control and appropriate ventilation. This program collects the following materials for reuse:

- Household Cleaners
- Paints and Solvents
- Pool and Spa Cleaners
- Motor Oil and Automotive Fluids
- Wood Preservatives and Sealers
- Adhesives, Glue, Putty, and Caulk

Materials Exchange Networks / Sharing Libraries

The El Cerrito Recycling Center[13] offers local residents the opportunity to recycle and reuse household items. It accepts and offers the following items:

- Art and Office Supplies
- Corks
- Garden Pots
- Hangers
- Housewares
- Media (Books, Magazines, CDs)
- Office Supplies
- Reading Glasses
- Sporting Goods
- Small household furniture
- Tools and Hardware
- Toys and Games

There are also several recycled art studios in Los Angeles that are geared towards education on waste reduction and reuse while promoting art. ReDiscover, Trash for Teaching, and CReATE Studio all focus on collecting donations from residents or commercial businesses, and using these materials that would otherwise be sent to recycling or disposal to create unique artwork.

Opportunities for sharing libraries could include:

- Recycled Art Materials
- Building Supplies Depot
- Tool Sharing Centers

11 San José Bike Clinic. "About San José Bike Clinic." Available at http://www.sjbikeclinic.org. Accessed January 19, 2021.
12 Good Karma Bikes. "Our Program." Available at https://goodkarmabikes.org/programs/. Accessed January 19, 2021.
13 https://el-cerrito.org/533/Recycling-Environmental-Resource-Center

Extended Producer Responsibility (EPR)

EPR programs shift the responsibility of waste management from municipalities to producers and encourage producers to invest in improving their products and packaging through product design. Stewardship programs generally rely on consumer-paid environmental fees or public funds (e.g. fees on tires, or automobile batteries). There is a growing shift from stewardship fees to EPR to incentivize producers to innovate and reduce the waste associated with their product.

Examples of two stewardship programs within California are the Mattress Recycling Council, which benefits from a $16.00 consumer recycling fee on mattresses or box springs, and the California Carpet Stewardship Program, which generates funding through a 33 cents per square yard levied on carpet sold.

Food Waste Prevention and Recovery

In order to further the underlying goals of enhancing quality of life and of the environment, food waste prevention and rescue programs should be prioritized based on their effectiveness at helping hungry people transition out of poverty, and promoting local, resilient agriculture and food systems.

To this end, the City's EP3 already includes guidance to "ensure that at least 30 percent of direct purchases of food served in City facilities is locally grown and organic." The City can expand on this initiative by taking the lead on SPUR's call for Santa Clara County to adopt the Good Food Purchasing Policy that has already been adopted by already underway in cities such as Los Angeles, San Francisco, Oakland, and Chicago.[14] The Good Food Purchasing Policy provides a standards-based framework that allows institutions to purchase food that is verified to support human and environmental health, local economies, and human and animal welfare.

If San José's School-City Collaborative can help spread these Good Food Purchasing policies to the School District, the benefits could be especially great, as serving organic, locally sourced and prepared food at schools can reduce food waste dramatically. A non-profit-public collaboration between Conscious Kitchen and two Marin City public schools showed as much as 62 percent reduction in food and packaging waste through serving fresh, local, organic, seasonal food on reusable service-ware.[15]

Beyond food purchasing policies, San José City departments can develop customized plans for office events to ensure that guest counts are accurate to prevent over-ordering, and to put in place a food donation plan so any left-overs are not wasted. A valuable resource in this effort is the Silicon Valley Food Recovery Council,[16] a robust collaborative of prepared food recovery programs that provides both technology and on-the-ground solutions for getting excess food to hungry people. Waste Not OC is an example the City could follow of a public-private partnership in Orange County that not only helps generators donate to food rescue organizations, but also emphasizes the prevention of excess food generation through tracking.

SB 1383 has a two-pronged goal – reduce methane, a greenhouse gas that is released when organic materials decompose in landfills, and increase statewide edible food recovery efforts. It requires that certain businesses donate surplus food instead of throwing it out as well as places additional recordkeeping

14 https://goodfoodcities.org/cities/
15 https://www.consciouskitchen.org/impact/
16 https://jointventure.org/silicon-valley-food-recovery-initiative/silicon-valley-food-recovery-council

and reporting requirements on these businesses. Since the regulations were finalized in November 2020, City staff have been engaging regionally with other cities and with food recovery organizations and services in a County-wide work group to discuss potential collaborative efforts. Joint Venture Silicon Valley has been contracted to manage the Santa Clara County Food Recovery Program planning and implementation.[17] This regional effort will ensure the City's compliance with SB1383 and support food recovery activities throughout the county.

17 www.SCCFoodRecovery.org

Enhanced Construction & Demolition Waste Prevention and Diversion

Deconstruction: The San José Youth Commission recommended in October 2020 that the City follow Palo Alto's lead in requiring deconstruction instead of demolition city-wide.[18] Palo Alto's deconstruction ordinance requires any project where structures are being removed to salvage all materials identified in a mandatory third-party salvage survey.[19] This could help decrease the short-term economic advantages of demolition, allowing for the environmental and job-creation benefits of deconstruction to take root.

18 https://www.sanJoseca.gov/home/showpublisheddocument?id=65285
19 https://www.cityofpaloalto.org/Departments/Public-Works/Zero-Waste/Zero-Waste-Requirements-Guidelines/Deconstruction-Ordinance

Procurement and Purchasing Requirements

The City's Environmentally Preferable Purchasing Policy (EP3) requires all City Departments to choose appropriate products, based on attributes such as durability, recycled content, recyclability/compostability, and reusability.[20] This policy can be a powerful tool to inspire adaptation and replication of successful initiatives, and accountability to continued progress.

Sharing Economy

The EP3 could be improved by highlighting material sharing as the most environmentally beneficial option. San José already demonstrates this prioritization through its innovative Facility Reuse Program,[21] which makes its 50 community centers available at no charge to organizations and agencies that benefit San José's residents. The "Facility Reuse Program" has been re-branded as the "Neighborhood Center Partner Program" to recognize that the strength of the program is determined by the community-based partners that provide services at the City's neighborhood-based facilities. The sharing economy could be expanded within City Government through a system such as San Francisco's Virtual Warehouse,[22] where City departments can post surplus items such as office furniture and supplies, electronics, and appliances and other departments can "shop" for items they need.

Procurement of Recovered Organic Waste Products

Beginning January 1, 2022, State Bill (SB) 1383 requires cities and counties to procure annually a quantity of recovered organic waste products to meet their annual procurement target. SB 1383 Procurement Regulations (14 CCR Article

20 https://www.sanjoseca.gov/your-government/departments-offices/environmental-services/business-school-resources/environmentally-preferable-procurement

21 https://www.sanjoseca.gov/your-government/departments-offices/parks-recreation-neighborhood-services/get-involved/neighborhood-center-partner-program

22 https://sfenvironment.org/virtualwarehouse

12) describes the options available for meeting SB 1383's requirements for procurement of recovered organic waste products: compost, mulch, and energy (electricity, heat, or gas) generated from organic wastes. The City will have many opportunities to meet its procurement goals through the electrical power from ZWED, and other power and fuel projects as they come online, but in the short term, compost and mulch use are the most promising avenues. San José can apply compost and mulch to its natural and working lands, City parks and facilities, community centers and gardens, and its many BeautifySJ neighborhood improvement sites. San José could meet its recovered organic waste procurement requirements by applying compost to approximately 860 acres at 50 tons per acre,[23] and/or mulching approximately 4,000 acres at 20 tons per acre.[24] Compost and mulch can be used in tandem, so these acreages can overlap.

23 https://www2.calrecycle.ca.gov/Publications/Details/998
24 https://web.archive.org/web/20170211113052/https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_006305.pdf

Logistical and Behavioral Challenges

The City has no influence on waste services offered at schools, universities, and jails since these local entities typically have service provided through their own contractors. Evidence has shown that people are resistant to change their behavior and lifestyle even though they are putting enormous pressure on the earth through their high level of consumption. Therefore, education on the importance of behavior change and sustainable consumption is crucial for the waste management sector in the future.

Food Waste

Thirty-four million pounds of edible food went to landfill in Santa Clara County in 2013, with many additional millions of pounds going to anaerobic digestion or compost, all in a year with a deficit of about 125 million meals countywide for needy families.[25] Nationally, forty percent of the food produced is wasted, and producing this wasted food consumes more than twenty percent of U.S. land, four percent of the U.S. energy budget, and more than thirty percent of all consumptive freshwater use.[26]

Food losses vary greatly by food type, and occur throughout the supply system – from farm to table and beyond. Broad societal changes are necessary to address some of the deepest challenges to food waste prevention, such as artificially cheap food, consumer expectations for cosmetically "perfect" food, economic incentives for wasting and over-purchasing, and externalization of environmental and human costs of wasted food.

The challenges most applicable to preventing food waste in San José include:

- Lack of available staff at stores, schools, and institutions to measure wasted food, manage edible food donation, and implement food-waste prevention strategies such as preparing food on-site and involving consumers (students, residents, customers, etc.) in food choices
- Confusion among consumers about the meanings of food label dates, such as "Best by", "Sell by" and "Use by"

25 https://web.archive.org/web/20220124184612/https://reducewaste.sccgov.org/sites/g/files/exjcpb691/files/FoodShiftFinalReport.pdf

26 https://www.nrdc.org/sites/default/files/wasted-food-IP.pdf

- Barriers to food recovery, including:
  - → Confusion and fear about liability for safety of donated food
  - → Lack of food recovery infrastructure, and staffing
  - → Logistical challenges to matching supply and demand with regard to food type, time, and geography
  - → Lack of awareness of food donation opportunities

Institutional Material Streams (Educational, Medical, Correctional, Corporate Businesses)

Challenges in these sectors include:

- Schools, jails, businesses, etc. may require repeated education efforts because of population changeover
- Medical facilities handle a wide variety of materials, many of which are disposable/ hard to recycle and/or require special handling to prevent pathogen spread
- Jails have many security restrictions that can hamper the efficient movement of materials
- Jails and medical facilities frequently deal with high-risk situations, putting non-emergency factors, such as waste prevention and diversion, at a perennial priority disadvantage
- Corporate Businesses (Costco. Malls, Target. Etc.) have their own region wide solid waste hauler contractors, often leading to difficulties in changing jurisdictional policies since all changes must be made at corporate level

Recycling aluminum cans saves 95% of the energy required to make the same amount of aluminum from its virgin source. One ton of recycled aluminum saves 14,000 kilowatt hours of energy, 40 barrels of oil, 238 million Btu's of energy, and 10 cubic yards of landfill space.


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A-4 Greenhouse Gas Emissions & Waste Diversion Estimates Methodology

Overview

This document describes this Element's methodology to understand greenhouse gas (GHG) emissions and emissions reduction estimates associated with "Zero Waste Strategies". The result is a methodology that is replicable in future years, lightly updated from the methodology used to create the (draft) 2022 Zero Waste Element, compliant with the U.S. Community Protocol (USCP), aligned with industry standards, and reflective of the Element's strategy-level emissions reduction estimates based on 2021 citywide emissions.[27]

The methodology describes the sources, assumptions, and protocol(s) used to develop GHG emissions reduction estimates and diversion estimates, for each Zero Waste Strategy.

Methodology

The methodology encompasses three separate analyses to ultimately understand the potential of each Zero Waste Strategy to divert waste from landfill and lead to GHG emissions reductions:

- **An emissions analysis**, to understand waste-related GHG emissions.
- **An avoided emissions analysis**, to understand the total GHG emissions reductions achieved if the Element's diversion goals are met.
- **A diversion potential forecast**, to understand the amount of waste diverted, and the associated GHG emissions reductions, by strategy if they are implemented to an extent that meets the Element's diversion goals.

Emissions Analysis

The project team calculated San José's waste-related GHG emissions associated with the following destinations: landfill, combustion, compost, and anaerobic digestion. Recycling is not included in emissions analysis per the protocol.

To complete the calculations, the project team gathered the data below as applicable:

- Activity data – San José consumption data (e.g., municipally collected waste tonnage) for each solid waste destination.
- Landfill characteristics – Key aspects of landfills that receive San José's municipal solid waste, such as location, annual precipitation received, and methane collection scenario, that have implications for solid waste GHG emissions.

Then, the project team

27 US Community Protocol | ICLEI USA (Appendix E Solid Waste Emission Activities and Sources)

calculated the GHG emissions associated with solid waste tonnage decomposition and transportation to each destination, using the EPA's WARM guidance.[28] The team added results from each solid waste destination into a summary workbook.

Landfilled Waste

Activity Data & Landfill Characteristics

The project team first pulled landfill tonnage, by sector (residential, commercial, and C&D), from the 2021 San José Waste Characterization; data was provided by the Integrated Waste Management division.

Then, the team determined tonnage by sector, destination location (in-boundary or out-of-boundary), and methane collection scenario input. Destination location information came from CalRecycle's annual report.[29] Methane collection scenario came from the EPA's Landfill Methane Outreach Program (LMOP) database and the EPA's FLIGHT tool.[30,31]

Emissions Calculations

To calculate GHG emissions of waste transported to out-of-boundary landfills, the project team calculated a weighted average of distance traveled to the landfill, based on tonnage, and applied the protocol's out-of-boundary transportation emissions factor to the weighted average miles traveled. Emissions factors used are from WARM v16.[32]

Next, the project team transcribed the jurisdiction waste characterization material type (from the 2021 San José waste characterization) to EPA WARM16 Material Type.

Combusted Waste

Activity Data

San José's combusted waste is currently sent to Covanta Stanislaus. The project team sourced San José's combusted waste tonnage from CalRecycle's annual report and sourced Covanta Stanislaus' total 2021 tonnage received from CalRecycle's RDRS (Jurisdiction Disposal and Beneficial Reuse by Destination) Report.[33] The report indicates that Covanta Stanislaus reported a total of 5.75 tons from San José, out of a total of 250,876.36 tons from all jurisdictions. All tons were reported under "Transformation (Includes host assigned tons due to missing reports)."

Emissions Calculations

To calculate emissions from combusted waste, the project team sourced Covanta Stanislaus' total 2021 emissions from EPA's FLIGHT tool,[34] then determined San José's portion of emissions by determining San José's portion of tonnage.

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28 Waste Reduction Model (WARM) | US EPA
29 Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility
30 LMOP Landfill and Project Database | US EPA
31 EPA Facility Level GHG Emissions Data
32 Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM) - Management Practices Chapters (epa.gov) (Exhibit 6-8 and Exhibit 6-10).
33 CalRecycle's RDRS Report 2
34 GHG Facility Details

Composted Waste

Activity Data

The project team pulled composted tonnage, by sector (residential, commercial, and C&D), from the 2021 San José Waste Characterization. Residential is the only sector analyzed for emissions – the commercial tonnage is from ZWED and therefore those emissions are accounted for in anaerobic digestion; C&D had no composted waste.

Emissions Calculations

The project team transcribed the Jurisdiction Waste Characterization Material Type (from the 2021 waste characterization) to EPA WARM16 Material Type. Emissions factors used are from WARM v16.[35]

Anaerobic Digestion

Activity Data

The project team sourced anaerobically digested tonnage, by sector (residential, commercial, and C&D), from the 2021 San José Waste Characterization.

Emissions Calculations

To calculate emissions from anaerobically digested waste, the project team applied emissions factors provided by the Lawrence Berkeley National Lab.

Avoided Emissions Analysis

This analysis estimated the emissions reductions associated with achieving diversion goals in the Zero Waste Element. To calculate these emissions reductions, the project team:

- Added solid waste tonnages from recycling, compost, and anaerobic digestion by sector (residential, commercial, and C&D), and material type, from the 2021 San José Waste Characterization.
- Applied the percent of waste sent to a landfill with and without methane collection to the diverted tonnage.
- Applied EPA WARM v16 landfill emissions factors to diverted tonnage to estimate avoided emissions.

Diversion Potential Forecast

This analysis estimated the amount of waste diverted by Zero Waste Strategy and the associated GHG emissions reductions if the strategies are implemented to an extent that meets the Element's overall diversion goals.

First, to understand diversion potential of each Zero Waste Strategy, the

35 Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM) - Management Practices Chapters (epa.gov) (Exhibit 4-1).

project team estimated total waste diverted, based on the Element's diversion goals, after population growth. Then they distributed estimated diversion potential across strategies by applying consultant-developed capture rates to tonnage in each material type from the waste characterization.

Finally, to understand emissions reductions by Zero Waste Strategy, the total emissions reduction was distributed across individual strategies by separately estimating the individual tonnage and emissions reduction of each strategy, applying an approach implemented by the consultant team that created the 2022 (draft) Zero Waste Element. Individual tonnage reductions by material type were estimated by making assumptions around the percentage (1%, 5%, 10%, 20%, or 25%) of landfill tons that each strategy would divert for each sector (information on the sources for these assumptions is not available). Then emissions reductions factors from EPA WARM for recycling, composting, and source reduction were applied to those tonnage reductions.

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Click here to learn more about the Zero Waste Element