

Aspirational Programs and Best Practices

Zero Waste Roadmap Development

Prepared for: City of Tucson Environmental
and General Services Department

Tucson, Arizona

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Acronyms and Abbreviations

C&D	construction and demolition
City	City of Tucson
EJ	environmental justice
HHW	household hazardous waste
LRSC	Los Reales Sustainability Campus
Metro	Oregon Metro
MRF	materials recovery facility
MSW	municipal solid waste
NRC	neighborhood recycling center
Roadmap	City of Tucson's Zero Waste Roadmap
SPU	Seattle Public Utilities



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1 Introduction

HDR has been retained by the City of Tucson (City) to assist the City during the first phase of its move toward “zero waste” with the implementation of the Zero Waste Roadmap (Roadmap). The Roadmap is meant to gather information on what “zero waste” means to Tucson and to identify strategies that would best support that vision.

The City previously identified and commissioned a report on five cities with zero waste or solid waste management plans that it considers to be aspirational; these plans contain best practices that may be applicable to Tucson. As part of the Roadmap development efforts, HDR reviewed this previous research and the latest versions of the plans and progress reports for these previously identified cities. In addition, new areas of focus were added, such as environmental justice (EJ), and interviews were conducted with representatives from several jurisdictions to provide further insight that could be valuable to the City as it embarks on its own path toward zero waste. Interview notes are provided in Appendix A.

1.1 Selection of Communities

Many jurisdictions in North America have innovative features as part of their waste management programs and services. This benchmarking memo discusses five communities that have some similarities to Tucson and have implemented best practices that may be of interest to the City.

Five jurisdictions/communities in the western United States were previously reviewed for Tucson, and the relevant information was updated to support this project. The communities selected include Austin, Texas; Denver, Colorado; Phoenix, Arizona; Portland, Oregon; and Seattle, Washington. Their solid waste plans are listed in Section 11, *References*.

While many aspects of these programs could be assessed, the following metrics were chosen in consultation with the City for benchmarking:

- population and demographics
- waste reduction and diversion goals
- definition of zero waste
- waste composition, if available
- diversion rates
- partnerships/collaborations
- economics and end markets
- EJ indicators
- current engagement and education efforts
- policy, legislative, and/or regulatory requirements (for example, extended producer responsibility programs)

2 Zero Waste Goals

Zero waste goals have been adopted by many communities to improve their solid waste management programs. The chosen communities in this report have each created their own zero waste plans and have defined the term *zero waste* to meet their community's goals or visions. Zero waste goals are established in zero waste plans or as targets in a master plan.

2.1 Tucson

The City of Tucson is in the process of defining *zero waste* and identifying waste reduction goals. The City declared a Climate Emergency in a resolution approved in September 2020. The Resolution states that the City will develop a Zero Waste Plan with a 50 percent waste diversion goal by 2030 and a goal of zero waste by 2050.

The City gathered public feedback on zero waste in the Climate Action Community Survey, which was rolled out in February 2021. The results indicated that respondents support waste reduction and diversion programs, particularly by increasing recycling compliance and landfill waste diversion. Most respondents also supported pilot programs for curbside collection of compostable materials. For more information on the survey and the City's existing waste infrastructure, see the *Current Conditions Assessment* memo, dated June 2022.

2.2 Austin

The City of Austin defines *zero waste* as designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.¹ Austin developed the *Austin Resource Recovery Master Plan* in 2011, which set goals to divert 85 percent of its waste from landfills by 2025 and 95 percent or more by 2040, and to achieve a restorative economy by 2050. Austin adopted the concept of the restorative economy from Paul Hawken, a prominent environmental activist, as follows:

In a restorative, "least cost economy," we move to that system of agriculture, forestry, transportation, construction, and communication that has the least cost to the environment... In a least-cost system, those resources, our "natural capital," are valued at their true replacement cost. Instead of competing to produce the cheapest goods in terms of price, we compete to produce the goods and services we need, according to which have the lowest impact on those resources and thus the lowest cost to current and future generations.²

In the Plan, the City set forth the following goals:

- Expand and improve local and regional reuse, recycling, and composting programs;
- Adopt new rules and incentives to reward those who embrace the goal of zero waste;

¹ *Austin Resource Recovery Master Plan*, https://www.austintexas.gov/sites/default/files/files/Trash_and_Recycling/MasterPlan_Final_12.30.pdf, 2011

² Ibid.

- Develop green campuses and resource recovery parks for zero waste infrastructure;
- Advocate for producer and retailer responsibility for product and packaging wastes, and bans on problem materials;
- Educate and advocate for a zero waste agenda as part of climate change and sustainability policies and programs; and
- Involve the community through collaboration and partnerships to achieve zero waste.

2.3 Denver

Denver produced a *Master Plan for Managing Solid Waste in the Mile High City* in 2010, which defined a zero waste economy as one in which less is consumed, all products are built to last and are easy to reuse and repair, and all materials are reused, recycled, and composted in a continuous cycle.³ Denver stated that it wanted to have a 34 percent reduction in the total landfilled waste by 2020. For City facilities, the goal diversion rate was higher, at 40 percent.

The State of Colorado performs an annual waste composition study to track diversion rates between recycling, compost, and what ends up at landfills.

2.4 Phoenix

Phoenix developed its *Solid Waste Strategic Plan* (Fiscal Years 2016–2021) in 2015 to achieve 40 percent diversion by 2020 and to become a zero waste city by 2040.⁴ In a recent interview with the City of Phoenix, City representatives said they are currently producing an updated solid waste plan to achieve zero waste by 2050. The term *zero waste* has not been defined by the City because it is flexible and evolving. Phoenix works through a circular economy model to increase waste diversion.

In the 2015 *Solid Waste Strategic Plan*, Phoenix outlines five major strategic focus areas with targets and metrics.⁵ Those focus areas were defined as:

- Sustainable Infrastructure – Supporting environmentally sound design, construction, and maintenance;
- Net-Positive Operations – Maximize efficiency, reduce impact, increase handprint;
- Community & Economic Development – Promote quality local jobs and business attraction, create a circular economy;
- Education and Community – Transform behavior, empowerment through communication; and
- Healthy and Safe Environment – Protect the environment, residents, and employees.

³ CoPIRG, <https://copirg.org/feature/cop/Zero-waste#:~:text=A%20Zero%2Dwaste%20economy%20is,composted%20in%20a%20continuous%20cycle>, March 2022

⁴ Solid Waste Strategic Plan, <https://www.phoenix.gov/publicworkssite/Documents/Final%202016.2021.Strategic%20Plan.pdf>, May 2015

⁵ Ibid.

Within each major goal, Phoenix defined several steps for the City to improve its waste diversion, measure success, and identify programs to achieve goals.

2.5 Portland

In researching zero waste goals and other metrics for the City of Portland, HDR also included Oregon Metro (Metro) and its relationship to the City of Portland. Metro is a public agency that serves 24 cities (including Portland) and 3 counties in the Portland region. It is the only regional government agency in the country that consists of elected officials. One of Metro's responsibilities is to plan and oversee the solid waste system for the region. State law made Metro responsible for creating an overarching waste management plan for the region. The plan is not necessarily meant to focus on diversion goals but to instead focus on the quality of and access to basic solid waste management services.⁶ Metro also supports cities with creating their own annual implementation plans in accordance with regional guidance and requirements.

In 2019, the Metro Council approved the 2030 *Regional Waste Plan*.⁷ The Plan is both a vision for the Portland region's garbage and recycling system and a blueprint for achieving that vision, focusing on the following three points:

- Listening and learning shaped the plan. Metro gathered input from more than 4,000 local residents to design program changes.
- Solutions by the community, for the community. The plan's goals and actions were generated in partnership with people most affected by historical injustices and inequities: people of color, immigrants and refugees, people with low incomes, residents of multifamily housing communities, and English language learners.
- Benefits will be shared by all residents. The plan moves the community toward a system where barriers and disparities are eliminated and includes actions designed to correct previous wrongs and honor the differences among people, no matter their race, immigration status, or income level.

The plan outlines:

- The values, principles, and vision to guide how improvements will be made and managed;
- 19 goals and 105 related actions to help the region achieve its vision by 2030; and
- An approach to carrying out the plan and measuring progress over time.

Cities within Metro may choose to go above and beyond the requirements of the *Regional Waste Plan* and may develop their own specific diversion goals. In 2008, the City of Portland set a goal to achieve a 75 percent diversion rate by 2015,⁸ and current recovery rates are around 54 percent. In 2015, a new goal was adopted to reduce per capita solid waste by 33 percent and to recover 90 percent of municipal solid waste

⁶ Phone interview with Luis Sandoval, Senior Solid Waste Planner at Metro, March 29, 2022

⁷ Regional Waste Plan, <https://www.oregonmetro.gov/regional-waste-plan>, 2019

⁸ Portland Recycles, <https://www.portlandoregon.gov/bps/article/230043>, 2008

(MSW) that is generated. There is an intentional focus on food scraps, with a reduction goal of 90 percent.⁹

2.6 Seattle

Seattle defines *zero waste* as designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.¹⁰

Seattle sets goals and reports its updates in various reports rather than one master plan. The City produces an annual waste prevention and recycling report to show progress towards key goals, a solid waste quarterly report that reports all the tonnage data, and construction, demolition, and land waste, transfer station, and recycling market reports more specific to their scope of work. Future specific goals will be included in Seattle’s 2022 *Solid Waste Plan Update* to work toward a preventative strategic plan with multiyear planning initiatives on waste prevention efforts.¹¹

2.7 Comparison of Goals

Table 2-1 shows a timeline for each jurisdiction’s waste reduction and diversion goals.

Table 2-1. Comparison of goals

City	2020	2030	2040	2050
Tucson	—	50% diversion	—	Zero waste
Austin	75% diversion	90% diversion	95% diversion	Restorative economy
Denver	34% citywide recycling goal	—	—	—
Phoenix	40% diversion	—	Zero waste	—
Portland	75% recycling rate	Recover 90% of generated MSW	—	—
Seattle	To be redefined in the 2022 <i>Solid Waste Plan Update</i>	—	—	—

⁹ Refuse & Recycling Study, MSW Consultants, 2020

¹⁰ Seattle Public Utilities, <http://www.seattle.gov/utilities/about/plans/solid-waste/Zero-waste>, 2004

¹¹ 2020 *Waste Prevention & Recycling Report*, http://www.seattle.gov/documents/Departments/SPU/Documents/Recycling_Rate_Report_2020.pdf, 2020

3 Population and Demographics

The following sections provide an overview of the population and demographics of each community, according to the U.S. Census Bureau.¹²

3.1 Tucson

Tucson is the second-largest city in Arizona, with a population of 557,718, according to the 2020 census. The geographic area of Tucson is 238 square miles, and the City has a population density of 2,343 persons per square mile (the lowest of any city included in this evaluation). The City's estimated population growth is 0.5 to 1.5 percent per year.

3.2 Austin

Austin ranks as the 10th-largest city in America and the fastest-growing city in Texas.¹³ According to the U.S. Census Bureau, in 2020, the population was estimated at 1,028,255, and Austin has experienced 30 percent growth since 2010. The city spans over 327 square miles, resulting in a population density of 3,214 persons per square mile.

3.3 Denver

Denver is the largest city in Colorado, with a population of 715,522 according to the 2020 census. The city spans approximately 153.4 square miles, resulting in a population density of 4,742 persons per square mile. Since 2010, the City has had a 26.6 percent growth rate, consistently increasing by 1.7 percent each year.

3.4 Phoenix

Phoenix is the capital of Arizona, with a population of over 1.7 million. The city is the fifth-largest city in America and, in 2013, Phoenix ranked the eighth fastest-growing city, behind Las Vegas. The city's annual growth rate is approximately 1.5 percent; since the last census in 2010, the population has increased by 21.74 percent. Phoenix spans approximately 517 square miles, with a population density of 3,400 people per square mile.

3.5 Portland

Portland is the capital of Oregon and the state's most populated city, with a population of 652,503, according to the 2020 census. The city has grown at a constant rate of around 1 percent each year since 2010, with an overall growth of 14 percent. Portland covers approximately 133.4 square miles, with a population density of 4,995 people per square mile. Oregon governs with Oregon Metro as the overarching democratic council that sets the baseline for 24 cities and 3 counties in the Portland area, with a total population of

¹² U.S. Census Bureau, <https://www.census.gov/>, 2020

¹³ Austin World Population Review, <https://worldpopulationreview.com/us-cities/austin-tx-population>, 2022

more than 1.5 million people.¹⁴ The local government of Portland is required to follow the set standards and is also allowed to make stricter rules for city residents.

3.6 Seattle

Seattle, Washington state’s capital, is one of 14 cities in America that grew by more than 100,000 people in the last decade.¹⁵ There was 29.5 percent population growth between 2010 and 2020, bringing the population to 787,995. Seattle is 83.9 square miles, and the population density is over 9,396 people per square mile.

3.7 Comparison of Population and Demographics

This section compares population and population density because they may affect the costs of implementing additional collection services related to the distance between stops, time to service, and available markets. The median income is provided because it may indicate what residents are willing and/or able to pay for zero waste and waste reduction services. Demographics may have an impact on how outreach is conducted, including translation into additional languages.

Table 3-1 summarizes the information for the communities listed above in relation to Tucson. Compared to other communities, Tucson has the current lowest population and the lowest population density. Population, demographics, and EJ indicators are important factors when creating an equitable and inclusive zero waste plan. Key factors such as population density and food deserts contribute to material movement and distances. Distance affects tipping fees and shipping costs because the farther materials need to be shipped, the more expensive. The median income is also listed as a comparison reference point.

Table 3-1. Comparison of population and demographics

	Tucson ^a	Austin ^b	Denver ^c	Phoenix ^d	Portland ^e	Seattle ^f
Population	557,718	1,020,000	715,522	1,700,000	652,503	787,995
White (%)	43.9%	48.3%	54.2%	42.5%	70.6%	63.8%
Black/African American (%)	5.2%	7.8%	9.2%	7.1%	5.8%	7.3%
Hispanic/Latino (%)	43.6%	33.9%	29.9%	42.6%	9.7%	6.7%
Asian (%)	3.2%	7.6%	3.7%	3.8%	8.2%	15.4%
Foreign born (%)	15.3%	18.8%	15.0%	19.4%	13.5%	18.8%
Geographic area (square miles)	238.0	319.9	153.3	517.7	133.4	83.9

¹⁴ Oregon Metro, <https://www.oregonmetro.gov/regional-leadership/what-metro>, 2022

¹⁵ Seattle U.S. Census 2020 Data, <https://www.seattle.gov/opcd/population-and-demographics/about-seattle>, 2020

	Tucson ^a	Austin ^b	Denver ^c	Phoenix ^d	Portland ^e	Seattle ^f
Population density (people per square mile)	2,343	3,214	4,958	3,400	4,995	9,396
Median household income (2019 \$)	\$43,425	\$71,576	\$68,592	\$57,459	\$71,005	\$92,263
Poverty rate	22.45%	13.23%	12.86%	17.97%	13.72%	10.96%

^a U.S. Census Bureau, <https://www.census.gov/quickfacts/fact/table/tucsoncityarizona/US/POP010210>, 2022

^b U.S. Census Bureau, <https://www.census.gov/quickfacts/fact/table/austincitytexas/POP010210>, 2022

^c U.S. Census Bureau, <https://www.census.gov/quickfacts/fact/table/denvercitycolorado/POP010210>, 2022

^d U.S. Census Bureau, <https://www.census.gov/quickfacts/fact/table/phoenixcityarizona/POP010210>, 2022

^e U.S. Census Bureau, <https://www.census.gov/quickfacts/fact/table/portlandcityoregon/POP010210>, 2022

^f U.S. Census Bureau, <https://www.census.gov/quickfacts/fact/table/seattlecitywashington/POP010210>, 2022

4 Waste Composition

The following section breaks down the city-wide waste composition for each community based on recent waste characterization studies. When the distinction of materials was completed, the applicable breakdown is provided in Table 4-1.

4.1 Tucson

The City of Tucson used three waste characterization studies to estimate the composition of material being disposed of at LRSC: the City of Tucson Waste Diversion Plan and Roadmap (2014), City of Phoenix Waste Characterization Study (2015), and City of Phoenix Residential Waste Characterization Study (2017–2018), which were averaged to estimate current waste composition in Tucson. The waste breakdown for the City of Tucson is provided in Table 4-1.

4.2 Austin

Austin conducted a community diversion study in 2015 to represent the current recycling and waste characterization.¹⁶ The waste composition study involved making 1,500 observations at commercial facilities and creating zones to group approximately 80 to 150 businesses into categories. The commercial waste breakdown for the City of Austin is provided in Table 4-1.

¹⁶ Austin's 2015 *Community Diversion Study*, <https://www.austintexas.gov/sites/default/files/files/Resource Recovery/Austin s 2015 Community Diversion Study-Final-04.29.16.pdf>, April 2016

Table 4-1. Waste characterization study results per community as percentage of total materials

Material	Tucson ^a		Austin ^b		Denver ^c	Phoenix ^d		Portland ^d		Seattle ^f
	Recycling (%)	Trash (%)	Recycling (%)	Trash (%)	Recycling (%)	Recycling (%)	Trash (%)	All (%)	Recycling (%)	Trash (%)
Cardboard	24.7	—	68.5	51.7	29.8	—	—	9.0	16.4	—
Mixed paper	17.0	17.9	51.4	22.4	8.6	44.7	8.5	6.9	39.5	20.3
Hard plastics	8.6	10.1	38.9	18.1	3.2	11.0	5.7	6.2	5.0	11.5
Metals	4.1	3.8	36.7	5.9	1.6	4.2	2.3	5.1	2.5	3.1
Glass	16.2	2.0	9.8	2.1	4.1	9.6	1.6	0.8	26.1	2.3
Unknown	—	—	9.5	61.9	—	—	—	—	—	—
Trash	29.3	—	3.0	26.7	—	18.0	27.0	—	10.5	—
Plastic films	—	—	9.8	7.3	—	0.6	0.8	5.4	—	—
Organics	—	42.5	1.8	12.9	29.1	—	35.9	49.0	—	53.8
Textiles	—	—	1.0	3.3	1.5	—	—	6.2	—	—
Other	—	14.7	7.0	17.3	0.3	14.8	21.0	15.8	—	2.8
Commingled	—	—	—	—	0.2	—	—	—	—	—
Electronics	—	—	—	—	1.3	—	—	—	—	0.9
Tires	—	—	—	—	3.5	—	—	0.2	—	—
White goods	—	—	—	—	6.1	—	—	—	—	—
Yard trimmings	—	—	—	—	10.7	—	—	—	—	—

Material	Tucson ^a		Austin ^b		Denver ^c	Phoenix ^d		Portland ^d		Seattle ^f
	Recycling (%)	Trash (%)	Recycling (%)	Trash (%)	Recycling (%)	Recycling (%)	Trash (%)	All (%)	Recycling (%)	Trash (%)
Construction and demolition	—	8.4	—	—	—	1.7	6.8	—	4.6	—
Household hazardous waste	—	0.6	—	—	—	—	0.6	0.3	0.5	—

^a More detail on the City of Tucson’s waste characterization is included in the Current Conditions Assessment Memo (April 2022). The waste characterization of the trash was estimated using three waste characterization studies from the City of Tucson and the City of Phoenix: City of Tucson Waste Diversion Plan and Roadmap (2014), City of Phoenix Waste Characterization Study (2015), and City of Phoenix Residential Waste Characterization Study (2017-2018). The recycling summary was collected from the MRF, and does not include materials recycled at the LRSC, including household hazardous waste (HHW), scrap metal, or compostable materials diverted through the City’s FoodCycle program.

^b Austin’s 2015 *Community Diversion Study*, https://www.austintexas.gov/sites/default/files/files/Resource_Recovery/Austin_s_2015_Community_Diversion_Study-Final-04.29.16.pdf, 2016

^c 2020 Colorado Recycling Totals, <https://cdphe.colorado.gov/colorado-recycling-totals>, March 2022

^d *Residential Waste Characterization Study*, https://www.phoenix.gov/publicworkssite/Documents/Final_web_Phoenix_2017-18%20WCS.pdf, May 2018

^e *Waste Composition Study*, <https://www.oregon.gov/deq/mm/pages/waste-composition-study.aspx>, July 2018

^f Solid Waste Composition Studies, <https://www.seattle.gov/utilities/about/reports/solid-waste-reports/composition-studies>, 2014 and 2015

4.3 Denver

The State of Colorado conducts an annual waste composition study to track its progress toward its goal diversion rate.¹⁷ In 2020, the composition was divided between industrial materials and MSW materials from residential and commercial sources. Colorado's Solid Waste and Materials Management Program is responsible for monitoring and inspecting various facilities, ranging from landfills, recycling facilities, waste tire sites, to many others. The Program conducts annual waste composition studies of the waste disposed of at landfills, or diverted to recycling/composting facilities, or used for beneficial reuse and industrial recycling.¹⁸ While not specific to Denver, this is the best available data over time for the city.

4.4 Phoenix

In 2018, Phoenix conducted a waste characterization study to identify areas where diversion rates could use improvement. There were 260 hand-sorted garbage samples and 200 hand-sorted recycling samples to represent the residential waste in Phoenix.¹⁹ Notable findings from the study included that approximately 60 percent (77,400 tons) of the residential waste could potentially be diverted through recycling and compost programs.²⁰ In the recycling findings, it was noted that approximately 30.5 percent of the recycling stream contained contaminants. The waste breakdown provided in Table 4-1 includes both waste and recycling data.

4.5 Portland

The State of Oregon conducted a waste characterization study in 2016, collecting 974 samples weighing more than 200 pounds each.²¹ The data reflect samples collected from all waste streams, garbage, recycling, and composting levels. Samples were collected at landfills, transfer stations, and mixed solid waste processing facilities throughout the year to gauge an average waste stream to represent residential, commercial, and self-haul composition. Results for Portland are provided in Table 4-1.

4.6 Seattle

Seattle Public Utilities (SPU) conducted a residential waste composition study in 2014 and a residential recycling stream composition study in 2015.²² The residential waste and recycling streams consist of single-family and multifamily residences, where samples

¹⁷ 2020 Colorado Recycling Totals, <https://cdphe.colorado.gov/colorado-recycling-totals>, March 2022

¹⁸ Ibid.

¹⁹ *Residential Waste Characterization Study*, https://www.phoenix.gov/publicworkssite/Documents/Final_web_Phoenix_2017-18%20WCS.pdf, May 2018

²⁰ Ibid.

²¹ *Oregon Solid Waste Characterization and Composition Study*, <https://www.oregon.gov/deq/mm/pages/waste-composition-study.aspx>, July 2018

²² *Solid Waste Composition Studies*, <https://www.seattle.gov/utilities/about/reports/solid-waste-reports/composition-studies>, 2014 & 2015

were collected in eight sampling zones. In the waste stream study, 362 samples were sorted into 115 categories. For the recycling composition study, 270 samples were obtained from 177 single-family and 93 multifamily residences throughout 2015.

5 Recycling and Diversion Rates

The following sections provide an overview of each community's recycling and diversion rates.

5.1 Tucson

Currently, the waste streams that are either collected by the City or received at a City facility and are diverted from the landfill include recyclables sent to the MRF, scrap metal, household hazardous waste (HHW), City glass recycling, and compostable materials. Waste streams that are disposed of in Los Reales Landfill include residential and commercial waste collections from the City of Tucson, waste from City departments, commercial collection and disposal, and residential self-haul.

In 2021, approximately 797,000 tons of waste were collected or received via the waste streams listed above. Of that, 29,620 tons (3.72 percent) were diverted to the MRF, 894 tons (0.11 percent) were sent to scrap metal recycling, 518 tons (0.06 percent) were diverted as HHW, 1,713 tons (0.21 percent) were recycled through the City glass recycling program, and 261 tons (0.03 percent) were processed to create compost. This resulted in a diversion rate of 4.14 percent for the material that the City either collected or received in 2021. This diversion rate does not take into account other waste streams that are collected and transported elsewhere by others (e.g., material taken to the MRF by private haulers, commercial and multi-family accounts using private haulers that do not take material to the LRSC, and material taken to privately owned recycling and disposal sites). Data on this material may be tracked in the future in order to provide a more comprehensive picture of diversion within the City.

Focusing strictly on the City's collection services, the diversion rate for 2021 was 9.3 percent. The City collected 288,030 tons (90.7 percent) of trash and 29,620 tons (9.3 percent) of recycling from residential, commercial, and City department accounts.

5.2 Austin

In fiscal year (FY) 2021, the City of Austin reported a diversion rate of 41.96 percent, which is almost halfway to its goal of 95 percent by 2040. Austin Resource Recovery collected approximately 63,030 tons of recycling, 53,455 tons of compost, and 138,955 tons of trash from residential homes in FY 2021. A severe winter storm created a surplus of debris, which drastically increased the material collected through the compost curbside collection program compared to previous years.²³

²³Austin Resource Recovery Annual Report, <https://www.austintexas.gov/news/austin-resource-recovery-releases-2021-annual-report> February 2022

Austin used data from both the residential and commercial sectors to calculate the citywide diversion rate. Approximately 2,400 properties (including multifamily properties) and 37,555 businesses participated in the waste study. Randomly selected participating businesses provided data by estimating recycling and reuse quantities and quantities of waste reduced or not generated. Reuse organizations and large waste generators provided Austin Resource Recovery waste data, including residential trash collection, litter control, street cleaning, bulk material trash and recycling and reuse, household hazardous waste disposed and recycled and reused, Resource Recovery Center recycling, tires, and residential organics including yard trimmings, brush, and the residential organics pilot. Materials recovery facility (MRF) contamination rates were observed by sorting through commercial samples of recyclable materials.

The diversion rate equation from the waste characterization study is provided below:²⁴

$$\text{Diversion Rate} = \frac{\text{Tons Recycled} + \text{Tons Composted} + \text{Tons Reused} + \text{Tons Reduced}}{\text{Tons Diverted} + \text{Tons Disposed}}$$

5.3 Denver

The Colorado Department of Public Health and Environment reports a state diversion rate every year. In 2020, the state’s MSW diversion rate was approximately 15.3 percent, including materials recycled from residential and commercial sources of waste. The total diversion rate was reported at 35.8 percent, including residential, commercial, and industrial MSW, construction and demolition (C&D) debris, and other non-hazardous waste. The program in Colorado separates the total diversion rate from residential MSW to better inform the public.

The City of Denver does not report individually the total as residential or commercial components. Denver reported 761,941 tons of recycling and 273,316 tons of compost while landfilling 5,342,465 tons of MSW in 2020, resulting in an approximate diversion rate of 19.4 percent.²⁵ Denver calculates its diversion rate by totaling its recycling and compost tonnage and dividing it by the total MSW generated (landfilled, recycled, composted).

5.4 Phoenix

Reimagine Phoenix is the initiative to help Phoenix reach a citywide diversion rate of 40 percent by 2020. The latest reported data were from June 2019, when the diversion rate was 36 percent. In the *Residential Waste Characterization Study 2017–2018 Final Report*,²⁶ city-wide residential garbage and city-wide residential recycling were evaluated for single-family homes in the city. Phoenix groups waste into four categories to quantify diversion opportunities and their quantities as a percentage toward its goal. Curbside

²⁴ Austin’s 2015 *Community Diversion Study*, https://www.austintexas.gov/sites/default/files/files/Resource_Recovery/Austin_s_2015_Community_Diversion_Study-Final-04.29.16.pdf, April 2016

²⁵ 2020 Colorado Recycling Totals, <https://cdphe.colorado.gov/colorado-recycling-totals>, March 2022

²⁶ *Residential Waste Characterization Study*, https://www.phoenix.gov/publicworkssite/Documents/Final_web_Phoenix_2017-18%20WCS.pdf, May 2018

recycling includes materials accepted by recycling technologies, programs, and readily available markets. Compostable material includes organics, such as food waste and yard waste, even if a program in Phoenix does not yet accept them. Other recoverable material includes items that have markets available for recycling; however, the markets are not yet well-developed or are not a part of the curbside collection program. Lastly, non-recoverable waste includes trash and garbage that is not readily recyclable and cannot be diverted.

5.5 Portland

Portland is currently on track to reach its 2030 goal of diverting 90 percent of its waste. Portland distinguishes its waste as six main waste streams: household waste, commercial waste, yard debris, food waste, demolition material, and hazardous material. The FY 2018 to 2019 reported City recovery rate was 81 percent.²⁷ Composting accounts for 74 percent of the diverted waste. The lunch food scrap composting stations at public schools have helped reduce over 300,000 pounds of garbage annually by diverting food waste away from landfills and into proper composting facilities. Portland is continuously working to create unique ways for additional recycling methods to achieve its goal by 2030.

5.6 Seattle

Because of the pandemic, the residential generation in Seattle surpassed the commercial generation for the first time in 21 years.²⁸ The major shift came from the state being in lockdown and reducing commercial waste generated, which affected the overall waste generation by 6 percent. Recycling efforts in both residential and commercial sectors have continuously grown since 2003, when the Zero Waste Program began.

Recycling and composting rates remained high at 54 percent in 2020, despite the pandemic.²⁹ Residential waste, including single-family and multifamily units, accounts for approximately 45 percent of the MSW generated in Seattle, commercial generated 40 percent, and self-haul reported the remaining 15 percent of waste generated. In 2020, it was calculated that approximately 2.27 pounds per person of waste per day was generated, including 0.86 pounds per day per person disposed of and 1.14 pounds per person recycled and composted. Waste disposed of decreased by almost 40 percent from 2000, and recycling and composting reached an all-time high in 2010 but remains 8 percent higher than in 2000.

²⁷ Waste Recovery Dashboard, <https://www.portland.gov/bps/scg/scg-dashboard/waste-recovery>, March 2022

²⁸ Waste Prevention and Recycling Report, http://www.seattle.gov/documents/Departments/SPU/Documents/Recycling_Rate_Report_2020.pdf, September 2021

²⁹ Ibid.

6 Current Engagement

Waste reduction and diversion programs are important steps on the road to zero waste. Each of the five communities have taken different approaches to engagement—from municipal engagement to community organizations. The effectiveness of each program has varied by community and by program. The selected communities documented in this report have included programs in their zero waste plans to be considered and implemented (Table 6-1).

6.1 Tucson

The City of Tucson partners with the University of Arizona on the FoodCycle program, a commercial food waste collection service for local businesses within the City. The City plans to expand the program by diverting green waste from internal City departments, including the City’s Environmental and General Services Department, Tucson Clean and Beautiful, Reid Park Zoo, and Transportation and Mobility. The City plans to collect data on composting operations and management, the quality of compost that can be produced, and operational cost, and will use that information to eventually expand to a curbside composting service. The finished compost will be used to support the Tucson Million Trees Campaign, Green Stormwater Infrastructure program, roadside erosion stabilization, and daily cover and erosion and slope stabilization at the LRSC.

In 2021, the City implemented a program called “Feet on the Street” to provide direct feedback to curbside recyclers on their recycling behaviors. The study targeted approximately 24,000 households across the City (17 percent of all households receiving curbside recycling services). After the study, the percentage of recycling carts observed to contain contaminants fell from 44 percent at the beginning of the program to 18 percent at its conclusion. Furthermore, the percentage of contamination within the curbside recyclables sampled from the study areas fell from 24.5 percent to 19.1 percent (by weight). These results indicate that outreach and educational programs may be effective in reducing contamination rates at the MRF.

The City also offers recycling education to consumers. The City offers a free waste audit to local businesses who are considering adding recycling services. Recycle Coach, which is available both on the City’s website and as an app, provides information about waste and recycling pick-up schedules, guidance on recycling, and pick-up reminders. The City offers educational programming that teachers can use in their classrooms.

Table 6-1. Current engagement^a

	Tucson	Austin	Denver	Phoenix	Portland	Seattle
Programs and partnerships	<ul style="list-style-type: none"> FoodCycle Compost Program (University of Arizona) HHW collection program Tucson Clean & Beautiful 	<ul style="list-style-type: none"> Austin Green Business Leaders Program Keep Austin Beautiful Circular Economy Program Generation Zero 	<ul style="list-style-type: none"> Eco-Cycle CHaRM Denver Public School System Green Star School 	<ul style="list-style-type: none"> HHW Collection Program Green Business Leader Program Keep Phoenix Beautiful Recycle+ 	<ul style="list-style-type: none"> Resourceful PDX City of Portland Bureau of Planning and Sustainability 	<ul style="list-style-type: none"> Seattle Good Business Network PreCycle Innovation Clean City Program
Current engagement	<ul style="list-style-type: none"> Climate Action Community Survey gathered public feedback on the City's waste goals. "Feet on the Street" initiative provided direct feedback to curbside recyclers on their recycling behaviors. 	<ul style="list-style-type: none"> The Office of Sustainability-led Green Business Leader Program aids local businesses in waste reduction efforts. Expansion and relocation of RRF to better meet the community's needs. 	<ul style="list-style-type: none"> Eco-Cycle is one of the oldest and largest nonprofit recycling organizations in the U.S. CHaRM supports recycling and composting at local businesses and schools. Collection of recyclables at 82 of 207 Denver Public Schools. 	<ul style="list-style-type: none"> Public Works collects HHW to reduce contamination in the waste stream. Businesses meet a certain "green" criteria to be recognized and rewarded in the Green Business Leader program. Currently, 109 local businesses are eligible for the Green Business Leader program. 	<ul style="list-style-type: none"> "Pick it up, Portland" is coordinated by the City to engage the community in a 2-day litter pickup. Resourceful PDX hosts events that educate individuals on reducing waste and reusing materials. 	<ul style="list-style-type: none"> Seattle Good Business Network helps businesses and the community gain access to free tools, technical assistance, and other resources. The PreCycle Innovation is a competition for students and individuals to pitch their best idea on how to use recyclables/waste.
Education efforts	<ul style="list-style-type: none"> Free waste audit to business considering adding recycling services. Recycle Coach website and app provide waste and recycling pick-up schedule and recycling guidance. Classroom presentations available. 	<ul style="list-style-type: none"> Generation Zero organizes classroom presentations specific to grade level about recycling, trash processing, and the evolution of trash. 	<ul style="list-style-type: none"> Programs for preschool to grade 12 teach about traditional recycling, composting, and sustainability through the Green Star School Program. Monthly feedback to individual schools on program. 	<ul style="list-style-type: none"> Games and activities per grade level geared toward recycling and sustainability through Recycle+. "Oops/Shine On" educates residents on if they contaminated their recycling bin with informational door tags. 	<ul style="list-style-type: none"> Portland Public Schools^b have implemented the elimination of Styrofoam trays and trash separation and composting in the school cafeteria to give students hands-on experience. 	<ul style="list-style-type: none"> The innovation contest provides mentorship with a local college to provide workshops on sustainability and waste solutions.

^a See program descriptions in sections below.

^b Cafeteria Recycling/Composting, https://www.portlandschools.org/departments/operations/food_service/cafeteria_recycling_composting, March 2022

6.2 Austin

Keep Austin Beautiful is Austin's overarching program to increase waste diversion and reach its zero waste goal.³⁰ The Austin Green Business Leaders Program, led by the Office of Sustainability, has partnered with Austin to help local businesses focus on sustainability performance measures. Additionally, Austin works with local recycling facilities (see Section 7.2 for additional information on these facilities) to allow the addition of recyclable materials into the product market for the community by expanding and relocating the Resource Recovery Facilities to meet people's needs. FY 2019 expenses were broken down in the Keep Austin Beautiful 2019 Annual Report³¹ into three categories: Program Services, General & Administrative, and Fundraising. Respectively, each expense was approximately \$813,460, \$143,997, and \$80,648, totaling \$1,038,105. The program had \$1,034,468 in total revenue from corporations, charities, the government, and other individuals.

The Circular Economy Program is a partnership between Austin Resource Recovery and the Economic Development Department to enhance the circular economy in Austin to make it the "most vibrant" in the United States.³² Through this program, businesses and residents can obtain resources to reuse, repair, and share materials and maximize materials recyclability to its fullest extent. Events such as "Fix-it" clinics are held for residents to bring in broken household items and learn how to repair them.

Generation Zero in schools provides three presentations over the school year for each grade level, geared toward the current education level.³³ Starting from kindergarten, students learn about the nature of recycling and the science of composting. In high school, students learn more about the in-depth processes of trash, waste production, and disposal methods.

6.3 Denver

Denver currently partners with the public school system to promote education and additional recycling methods. The solid waste department provides single-stream recycling collections to 170 schools and compost collections in 40 selected schools.

Eco-Cycle³⁴ participates in educational programs in the classroom and throughout the community in Boulder and in Denver. The Green Star School program educates over 55,000 children from K-12 on sustainability, composting, and traditional recycling. Eco-Cycle is a nonprofit social enterprise, according to the 2020 Annual Report for CHaRM,³⁵ which means the organization conducts mission-based business activities and uses

³⁰ Keep Austin Beautiful, <https://keepaustinbeautiful.org/>, March 2022

³¹ Keep Austin Beautiful Annual Report 2019, <https://keepaustinbeautiful.org/wp-content/uploads/2020/01/Keep-Austin-Beautiful-2019-Annual-Report-FINAL.pdf>, June 2022

³² Circular Economy Program, <https://www.austintexas.gov/circulareconomy>, March 2022

³³ Generation Zero: K-12 Youth Education, <https://www.austintexas.gov/genZero>, March 2022

³⁴ Eco-Cycle, <https://www.ecocycle.org/schools/overview>, March 2022

³⁵ CHaRM 2020 Annual Report, https://ecocycle.org/files/pdfs/Annual_Reports/Eco-Cycle_Annual_Report_2019-2020.pdf, June 2022

surplus revenue to fund education, outreach, and advocacy. The top five categories for expenses and revenues in FY 2019–2020 are provided in Table 6-2.

Table 6-2. Eco-Cycle financial report

Activity	Expenses	Revenues
Boulder County Recycling Center Operations	4,363,580	4,619,114
Hauling of Commercial, Single-Stream, & Hard-to-Recycle Materials	1,986,742	1,949,811
Center for Hard-to-Recycle Materials	880,617	935,319
Programs	1,280,057	551,964
Fundraising	81,089	150,390
Total	\$8,592,085	\$8,206,598

CHaRM³⁶ is Denver’s Center for Hard-to-Recycle Materials, Colorado’s first community center for recycling electronics and other non-typical recyclables. CHaRM is a part of Eco-Cycle, one of the oldest and largest nonprofit recyclers in the United States. This program helps supports recycling at businesses and schools and advocates for schools to become “Green Star Schools.”

6.4 Phoenix

The City of Phoenix collaborates with the Public Works Department on a household hazardous waste collection program to reduce hazardous items placed in the trash and recycling.³⁷

The Green Business Leader Program recognizes businesses that operate in a more environmentally responsible manner through sustainable actions.³⁸ Depending on the quantity of sustainable actions the business takes, a business can achieve three different levels of certification, which return more benefits as the business progresses. This program requires businesses to meet a certain “green” criterion to be eligible for the benefits of being part of the program. To be eligible for the Green Business program, the business must:³⁹

- be located within Phoenix city limits
- achieve a minimum of 10 action items on the Green Business checklist
- provide quarterly metrics on the percentage of waste the business is diverting from the landfill (if applicable)

Currently, 108 businesses in Phoenix are part of the Green Business Leader Program.

³⁶ Eco-Cycle, <https://www.ecocycle.org/aboutus>, March 2022

³⁷ Household Hazardous Waste Collection, <https://www.phoenix.gov/publicworks/hhw>, March 2022

³⁸ Green Business Leader, <https://www.phoenix.gov/greenbusiness>, March 2022

³⁹ Ibid.

Reimagine Phoenix is the City's initiative to increase the City's waste diversion rate and better manage its solid waste resources.⁴⁰ Through Reimagine Phoenix, programs such as Recycle+ and inspection programs have helped educate the public on what more they can do to help.

The Zero Waste Team in Phoenix created the Recycle+ Education program, which educates children throughout their school years on sustainability.⁴¹ For younger age groups, games are brought into the classroom to educate children on what materials can and cannot be recycled; the older students learn more about the science behind sustainability.

The City of Phoenix implemented a cart inspection program called "Oops/Shine-On," which created teams of volunteers to examine recycling bins to reduce contaminants in the recycling stream. Team members sort the recycling, and if it contains too many contaminants, it does not pass the inspection, and a tag is left out to educate the residents on the materials in their bins.

6.5 Portland

As discussed in Section 2.5, Metro sets the baseline regulatory plan that the cities and counties under its authority need to follow and use in their own annual implementation plans. Metro works with the counties and cities on specific mandates to see what would be most beneficial, given the diversity in the region's population. The 2030 *Regional Waste Plan* was developed by Metro after extensive community outreach, beginning with forming partnerships with eight community organizations that were able to assist Metro with recruiting and leading discussions with participants to obtain input on what should be included in the 2030 *Regional Waste Plan*. These community organizations were chosen specifically for their work serving groups that typically don't participate in public engagement or whose voices are not typically heard at the regional planning level.⁴²

Portland develops its own climate change plan, sustainability plan, and additional waste diversion requirements, further explained in the FY 2021 *Annual Waste Reduction Plan* for the City of Portland.

Resourceful PDX is Portland's primary partnership to engage the community and businesses to become more sustainable.⁴³ Resourceful PDX encourages residents to connect on a business and personal level to collaborate and be successful in their waste reduction practices. Events such as "pick it up, Portland" are coordinated by the City of Portland Bureau of Planning and Sustainability to engage the community in neighborhood/park clean-up days.⁴⁴

⁴⁰ Reimagine Phoenix, <https://www.phoenix.gov/publicworks/reimagine>, March 2022

⁴¹ Recycle+,

<https://www.phoenix.gov/publicworks/recycleplus#:~:text=Public%20Works%20Recycle%2B&text=The%20Zero%20Waste%20team%20has,education%20directly%20to%20your%20homes!&text=We%20hope%20Recycle%2B%20motivates%20you,recycle%20right%20and%20recycle%20more>, March 2022

⁴² Phone interview with Luis Sandoval, Senior Solid Waste Planner at Metro, March 29, 2022

⁴³ Resourceful PDX, <https://www.resourcefulpdx.com/#home>, March 2022

⁴⁴ Pick it up, Portland, <https://www.solveoregon.org/pick-it-up-portland>, March 2022

Sustainability events, fix-it fairs, Resourceful PDX, and other programs in Portland are budgeted in the Sustainability Engagement Section of the Bureau of Planning and Sustainability's Requested Budget.⁴⁵ For these programs, there were 11.4 full-time employees. External Materials and Services expenses in 2018–2019 came to \$19,083. Internal Materials and Services came to \$5,000. There were no contingencies added to the funds.

6.6 Seattle

The Seattle Good Business Network⁴⁶ partnered with the City of Seattle to assist businesses and local communities in gaining access to free tools, technical assistance, and resources to help drive Seattle's recycling and diversion goals. The program partners with a local college by providing mentorships and workshops about sustainability and waste solutions in Washington State. The PreCycle Innovation challenge hosted by the network allows students, entrepreneurs, and individuals to pitch their ideas on using recycled materials/waste.

The City of Seattle has developed the Clean City Initiative to reduce littering, which can properly sort and divert more waste through the waste stream. Subgroups of the program include an Anti-Graffiti program, illegal dumping prevention program, and litter prevention program. The City of Seattle invests \$3 million into the ongoing work of the Clean City Initiative to continuously clean up litter and garbage from the streets.⁴⁷

7 Economics and End Markets

7.1 Tucson

The City provides trash and recycling collection services to all single-family households and some multifamily households and commercial businesses within the city limits. The City is responsible for managing and completing long-range planning for waste collection, recycling, and disposal operations within the city limits. These operations apply to a City-owned and operated MSW landfill, seven Neighborhood Recycling Centers (NRCs), 22 glass recycling drop-off locations, and equipment and facilities for waste collection, disposal, and recycling operations. The City also contracts with an MRF, the ReCommunity MRF owned by Republic Services, for residential and commercial recycling services.

The City of Tucson is in the process of identifying potential end markets for waste diverted from the landfill as part of the Zero Waste Roadmap Development Process.

⁴⁵ Bureau of Planning and Sustainability's Requested Budget, <https://www.portlandoregon.gov/cbo/article/752708>, January 2020

⁴⁶ Seattle Business, <https://seattlegood.org/sustainable-business/>, March 2022

⁴⁷ Clean City Initiative, <https://www.seattle.gov/parks/about-us/special-initiatives-and-programs/clean-city-initiative>, June 2022

7.2 Austin

In Austin, the City Department collects approximately 25 percent of MSW generated; approximately 68 percent is owned and operated by a private-sector service. The remaining waste is calculated at self-haul facilities. The Department relies on public-private partnerships because most reuse, recycling, composting, and landfill facilities are privately owned. The City's landfill is closed and currently under 30-year post-closure care. Development of the following infrastructure is to be expected from the partnerships with the private sector to aid in reaching Austin's goal of zero waste:⁴⁸

- Austin Reuse Centers – Drop-off facilities located around the City to collect reusable items, recyclables, and hard-to-recycle materials.
- MRFs for Recyclables – MRFs are constructed and operated by two private-sector companies under contract with the Department to support the single stream recycling program and the zero waste initiatives of the master plan.
- Resource Recovery Centers – For collecting hard-to-recycle materials such as appliances, tires, furniture, carpet, and paint.
- Composting Facilities for Organics – Expanded organics processing capacity at the Hornsby Bend Biosolids Management Plant. The City may contract for additional composting services, if deemed appropriate.
- C&D Debris Processing Facilities – For the recovery and recycling of debris from construction sites, in response to a future C&D debris ordinance.
- Eco-Industrial Park – An industrial system of production facilities that conserves natural and economic resources, reduces energy and water use, and provides opportunities for reuse or recycling of wasted materials.

The City Department provides biweekly single-stream recycling collection for materials including paper, boxboard, cardboard, aluminum and metal cans, glass, and rigid plastic containers. These items are collected in a 96-gallon container that is required and provided by the Department; smaller carts are available in addition to the 96-gallon cart with additional costs. The 96-gallon cart has a monthly rate of \$49.50, which covers curbside collection of garbage, recycling, large brush, and bulky item collection.⁴⁹ This does not include the monthly clean community fee of \$4.70, which aids the zero waste program, reuse centers, and other programs Austin supports in diversion efforts. In the future, Austin aims to increase the accepted recyclable materials to include aseptic and gable-top containers, durable plastics (household items and engineering grade plastics), plastic wrap film, aluminum foil, and small scrap metal items.

⁴⁸ Master Plan, https://www.austintexas.gov/sites/default/files/files/Trash_and_Recycling/MasterPlan_Final_12.30.pdf, 2011

⁴⁹ Residential Service Rates and Fees, <https://www.austintexas.gov/arrfees#:~:text=All%20residents%20in%20Austin%2C%20including,neighborhoods%20and%20the%20downtown%20area>. June 2022

7.3 Denver

Denver Public Works is responsible for trash collection for all the households in the City and County of Denver, the City's recycling program, and the City's composting program. According to the 2010 *Master Plan*, the trash collection service collects waste from approximately 170,000 households every week.⁵⁰ Denver Recycles is a voluntary program with more than 100,000 participants. Denver Composts is a pilot program where residents have to pay to participate, and it had more than 2,200 residents involved in 2010. The City offers three sizes of trash bins with varying costs, where the largest is a 95-gallon bin that has a monthly cost of \$21 per month.⁵¹ This monthly fee covers trash pickup, weekly recycling, composting, equipment operators, and other costs. The City and County own the landfill and own and operate the transfer stations. The landfill is contracted out and accepts all City-managed trash and C&D waste. The transfer station manages reuse and recycling programs such as Denver Recycles, seasonal recycling, large-item pickup, and household hazardous waste.

7.4 Phoenix

In Phoenix, the Public Works Department separates its solid waste department into three divisions: field services, diversion and disposal, and customer engagement. Field services is responsible for collecting residential garbage, recyclables, bulk trash, and green waste from over 390,000 households.⁵² As of January 2021, the monthly collection rate was raised to \$33.80, which includes weekly trash collection, weekly recycling collection, and quarterly bulk trash service.⁵³ Diversion and disposal operates the transfer stations and landfill operations and is responsible for reducing waste that enters landfills through recycling and monitoring at the transfer station. For ease of location, the City owns two transfer stations, one in the north and one south of the city, and waste is then transferred to State Route 85 Landfill.⁵⁴ The landfill is not open to the general public. Recyclables that are sent to either transfer station are sorted at the adjoining MRFs that are also owned by the City. In 2017, a new compost facility opened to help boost Phoenix's Green Organics program for business composting and household composting.⁵⁵

7.5 Portland

Metro is responsible for the garbage and recycling system in Portland. In the 2030 *Regional Waste Plan*, Metro stated that private haulers handle all waste. These are typically contracted by the cities or counties through franchise agreements or licensing.

⁵⁰ 2010 Master Plan, https://www.denvergov.org/content/dam/denvergov/Portals/709/documents/master-plan/master_plan_exec_summary.pdf

⁵¹ Denverite, <https://denverite.com/2022/01/19/paying-for-trash-collection-in-denver-the-city-has-started-getting-serious-about-the-idea/>, January 2022

⁵² 2021 Solid Waste Strategic Plan, <https://www.phoenix.gov/publicworkssite/Documents/Final%202016.2021.Strategic%20Plan.pdf>

⁵³ Phoenix Community Feedback, <https://www.phoenix.gov/newsroom/public-works/931>, February 2020

⁵⁴ Transfer Stations, <https://www.phoenix.gov/publicworks/garbage/disposable>, March 2022

⁵⁵ Composting in Phoenix, <https://www.phoenix.gov/publicworks/composting>, March 2022

Within the Metro region, more than 40 private hauler companies collect residential, business, school, and other institutional waste, recyclables, and food scraps. Monthly residential rates are based on the size of the garbage container, despite the varying companies, and trash is collected every other week. The largest container option is 90 gallons, at a monthly rate of \$45.70 beginning in July 2022.⁵⁶ This rate includes garbage, recycling, and compost services. Additional services such as extra yard waste or holiday trees are collected at an additional cost. Mixed recycling and glass are sent to separate sorting facilities to be recycled either locally or shipped to other parts of the country to be reused. There are seven transfer facilities, five private and two owned by Metro, where the garbage, yard debris, and food scraps go. Yard waste and food scraps are consolidated and sent to more than 40 composting or biogas facilities. Garbage from Portland is transferred to one of Oregon's seven landfills.

7.6 Seattle

SPU consists of public and private services to collect, transfer, process, and landfill the City's waste.⁵⁷ Two private contractors collect residential and commercial garbage, recyclables, and organics. Residents also can drop off their waste directly at a transfer station. Garbage and organics are picked up weekly, while recycling is collected every week. There are two different service levels that vary the cost of collection: curbside or backyard. Backyard collection includes an additional fee where families can have garbage picked up from their yard. The largest cart available, with the highest monthly cost, is a 96-gallon cart. Effective April 2022, the curbside monthly cost for the 96-gallon cart is \$126.40 per month, and the backyard collection is \$177 per month.⁵⁸ The contractors take the garbage and organics to one of two City-owned transfer stations. A local private transfer station is used when a City station is closed because of maintenance or unexpected equipment failures. Recyclable material is brought to a sorting plant. SPU has two contracts for processing recyclable and organic material, which receive about 60 percent of the organics and recyclables; the remaining materials are directed to other private processors from commercial businesses. Garbage is handled by Waste Management to rail haul and dispose of nonrecyclable waste at a Waste Management landfill in Gilliam County, Oregon.

8 Environmental Justice Considerations

8.1 Tucson

The City of Tucson has not conducted a specific EJ analysis at this point. The Climate Action Survey indicated that residents are interested in implementing measures in the climate action plan in an effort toward reaching equity.

⁵⁶ Residential Garbage Rates, <https://www.portland.gov/bps/garbage-recycling/home-recycling/residential-garbage-rates>, June 2022

⁵⁷ Picking up the Pace Towards Zero Waste, Chapter 4, <https://www.phoenix.gov/publicworks/composting>, 2011

⁵⁸ Garbage Rates, <https://www.seattle.gov/utilities/your-services/accounts-and-payments/rates/collection-and-disposal/garbage-rates>, June 2022

8.2 Austin

During the 15-month development period of the Austin *Solid Waste Master Plan*, residents and stakeholders were invited to workshops to provide input to help develop concepts and programs. No specific EJ analysis was completed.

8.3 Denver

In the 2020 *Annual Report to the Colorado General Assembly*, the program reports that EJ is addressed through the administration of the program and the decisions made.

8.4 Phoenix

The Public Works Department is focused on the triple-bottom-line (people, planet, and profit). While developing the current and past strategic plans, EJ indicators have always been considered, although they may not be specifically highlighted. In the next version of the *Strategic Plan*, the City wants to make sure that there is better documentation of how EJ indicators were used and how they were integrated with City's climate action plan.⁵⁹

8.5 Portland

The 2030 *Regional Waste Plan* took approximately a year and a half to complete. Engagement with eight community organizations was incorporated into the population and cultural diversity sections of the Plan. Metro used a power mapping analysis to identify groups that typically do not participate in environmental conversations. A facilitator was hired to coordinate the outreach and communication to the community organizations to build trust within the new relationship. Grants and stipends were provided to groups and individuals for participating and providing feedback with each outreach session.

8.6 Seattle

SPU consists of seven branches, one of which is the human resources and service equity branch, which is in charge of the Environmental Justice and Service Equity division.⁶⁰ The division reviews projects, programs, and services to ensure that human health and minority economies are not affected.

⁵⁹ Phone interview with Felipe Moreno, Assistant Public Works Director, Solid Waste Division, City of Phoenix, and Amanda Jordan, Circular Economy Project Manager, City of Phoenix, on March 18, 2022.

⁶⁰ Picking up the Pace Towards Zero Waste 2011, Chapter 6, <https://www.phoenix.gov/publicworks/composting>, 2011

9 Policy, Legislation, and/or Regulatory Requirements

9.1 Tucson

Currently, the City of Tucson does not have enforceable regulations to support its proposed zero waste initiative. However, in 2020, the City Council declared a Climate Emergency that set Tucson on a path for carbon neutrality by 2030. The City documents its progress in the Climate Action Hub. The City plans to take steps to slow down the impact of climate change while promoting equity, and is partnering with the private sector, academia, and community leaders to reach climate goals.

9.2 Austin

Austin has passed four main executive regulations that help enforce actions to meet its zero waste goals. A Universal Recycling Ordinance was passed to ensure that all commercial tenants, multifamily housing residents, and employees have access to recycling. This ordinance also covers food-permitted businesses, ensuring that employees have easy access to organic waste diversion for unused food, food scraps, and food-soiled paper.⁶¹

To support the City's Green Building efforts, the Construction and Demolition Recycling Ordinance took place to divert C&D waste away from landfills.⁶² General contractors are to not dispose of more than 2.5 pounds of material per square foot of floor area to the landfill, or divert at least 50 percent of the debris away from the landfill by reuse and recycling. If unable to, contractors may request a waiver or be subjected to a fine.

The remaining two ordinances include the Hauler Licensing Ordinance and the Special Events Ordinance.⁶³ The Hauler Licensing Ordinance requires all private haulers to obtain a private license at any stage in the waste cycle. The Special Events Ordinance requires all events in Austin to submit a waste management plan documenting how they plan to divert and reduce waste during the event.

9.3 Denver

Currently, Denver is working to pass a "Waste No More" ordinance, which would require all businesses, including residential complexes, to provide compost and recycling pickup services.⁶⁴

Recently, an ordinance that charges a fee for single-use bags was passed and put into effect in July 2021, along with an ordinance that will ban plastic bags beginning in 2023.

⁶¹ Universal Recycling Ordinance, <https://www.austintexas.gov/uro>, April 2022

⁶² Construction and Demolition Ordinance, <https://www.austintexas.gov/cd>, April 2022

⁶³ Zero Waste Ordinances, <https://www.austintexas.gov/circularresources>, April 2022

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Restaurants must follow the recently passed ordinance, Single-Use Accessory Restriction, that took effect in January 2022.⁶⁵ The ordinance takes away the automatic single-use plastic utensil given with take-away meals; customers must request them upon ordering. This has helped businesses reduce their impact on the waste stream and save them money by no longer needing to purchase the items.

9.4 Phoenix

In 2015, the State of Arizona passed a law that bans the regulation of single-use plastic bags/utensils and bans other environmental regulations. In a recent interview with the City, it was noted that the City plans all its programs assuming no regulations supporting the reduction of waste will be passed, and that incentives and voluntary efforts will drive waste reduction.

All participation in zero waste efforts has been completely voluntary by residents. Phoenix plans to expand with more incentive programs similar to the pay-as-you-throw program and to reduce the size of residents' garbage cans to increase engagement.

9.5 Portland

Similar to the other cities, Portland participates in banning single-use plastic bags at checkout locations in stores and requires customers to pay a 5-cent fee if the customer requests a paper bag. Paper checkout bags must also be made from at least 40 percent post-consumer recycled fiber.⁶⁶

9.6 Seattle

In 2014, Seattle enforced a municipal code that requires businesses to not put compostable material, including food, yard waste, and other recyclables, in their garbage, or they may receive a fine.⁶⁷ City inspectors inspect dumpsters to confirm businesses and buildings are properly sorting their waste and not allowing more than 10 percent of their waste to be recyclable.

⁶⁵ Single-Use Ban, <https://denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Climate-Action-Sustainability-Resiliency/Zero-Waste/Skip-The-Stuff>

⁶⁶ Plastic Bag Ban and Paper Fees, <https://www.portland.gov/bps/garbage-recycling/business-garbage-policies/bag-ban-and-fees>

⁶⁷ Ban of Recyclables in Garbage, [https://www.seattle.gov/utilities/your-services/collection-and-disposal/ban-of-recyclables-in-garbage#:~:text=Seattle%20Municipal%20Code%20\(SMC\)%20sections.and%20recyclables%20in%20their%20garbage](https://www.seattle.gov/utilities/your-services/collection-and-disposal/ban-of-recyclables-in-garbage#:~:text=Seattle%20Municipal%20Code%20(SMC)%20sections.and%20recyclables%20in%20their%20garbage)

10 Next Steps

Some of the discussed programs and legislation have been successful in helping the communities reduce waste consumption. Because no program can be 100 percent replicated, Tucson can learn from successes and challenges in these communities. While all these communities have different strengths, ultimately it will be up to stakeholders to make the decisions that are best for Tucson. As the Zero Waste Roadmap develops, this document can be a resource during the development of future programs.

Based on HDR's review of the five aspirational cities, HDR recommends that the City of Tucson consider the following measures:

1. Publish the Zero Waste Plan and initiate waste tracking.

Resolution No. 23222, which declared a climate emergency, set a waste diversion goal of 50 percent by 2030 and zero waste by 2050. The City of Tucson is currently diverting approximately 4.14 percent of its waste.⁶⁸ This diversion rate does not take into account other waste streams that are collected and transported elsewhere by others (e.g., material taken to the MRF by private haulers, commercial and multi-family accounts using private haulers that do not take material to the LRSC, and material taken to privately owned recycling and disposal sites). The City may consider collecting these data in the future to provide a more comprehensive picture of diversion within the City.

2. Expand organics composting efforts.

Based on a review of three waste characterization studies conducted in Tucson and Phoenix in 2014, 2015, and 2018, the organics fraction represents approximately 42.5 percent of Tucson's waste stream. This presents an opportunity to substantially increase diversion efforts.

In FY 2018 to 2019, the City of Portland reported that the City recovery rate was 81 percent, which is on track with the City's goal of 90 percent waste reduction by 2030. Composting accounts for 74 percent of Portland's diverted waste. The City of Portland also has lunch food scrap composting stations in schools, which have diverted 30,000 pounds of garbage per year.

The City of Tucson could initiate an organics composting program for residents and partner with businesses and schools to increase diversion. Successful collections programs would create demand for more organics processing capacity in the region, either at LRSC, private facilities, or a combination of both.

3. Decrease recycling contamination.

Recycling contamination represents approximately 30 percent of the material received by the City of Tucson's MRF. The high levels of contamination have cost the City approximately \$1.2 million since FY 2018. In 2021, the City of Tucson saw some success in reducing contamination when it implemented the "Feet on the Street" pilot program to provide direct feedback to curbside recyclers on their recycling behaviors. The City of

⁶⁸ Current Conditions Assessment, HDR Engineering, 2022

Phoenix has implemented a similar cart inspection program called “Oops/Shine-On,” which is staffed by teams of volunteers who examine recycling bins to reduce contaminants in the recycling stream. If bins have contamination, they leave a tag to educate residents on the materials in their bins. This is similar to Feet on the Street but is an ongoing program and is staffed by volunteers rather than paid consultants.

The City could set up a program like Oops/Shine-On. A reduction in recycling contamination could save the City money, which could then be funneled into other waste reduction programs.

4. Coordinate with local businesses.

The City of Phoenix has a Green Business Leader Program that recognizes businesses that operate in a more environmentally responsible manner through sustainable actions. Depending on the quantity of sustainable actions the business takes, a business can achieve three different levels of certification, which return more benefits as the business progresses. The City of Tucson already partners with businesses who are considering adding commercial recycling to their waste disposal services by providing a free waste audit. The City charges less for pickup services to businesses that elect to use both waste and recycling services. The City could expand their coordination with local businesses by creating a program similar to the Green Business Leader program, with benefits to businesses who participate.

5. Incorporate waste education into school curriculums.

The City of Tucson has teaching materials available on its website. However, City schools do not necessarily have a set curriculum that includes education on waste reduction. Denver and Phoenix both have educational programs in schools. The Green Star School program in Denver educates over 55,000 children from K-12 on sustainability, composting, and traditional recycling. The City of Phoenix has a Recycle+ Education program, which educates children throughout their school years on sustainability. For younger age groups, games are brought into the classroom to educate children on what materials can and cannot be recycled; the older students learn more about the science behind sustainability. The City of Tucson could implement a school curriculum that incorporates waste to make students and their family aware of existing waste diversion programs and how to participate in them.

6. Increase engagement with citizens.

The City of Tucson can benefit from understanding and learning from other communities with developed waste diversion plans. It is recommended that there be an overarching program such as “Keep Austin Beautiful” or “Resourceful PDX” to organize social media, event information, and diversion information for residents.

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Appendix A. Interview Notes



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Meeting Minutes

Project:	Tucson Zero Waste Roadmap	
Subject:	Task 3: Aspirational Program Interviews – City of Phoenix	
Date:	Friday, March 18, 2022	
Location:	Conference Call	
Attendees:	City of Phoenix Felipe Moreno, Asst PW Director, Solid Waste Division <felipe.moreno@phoenix.gov> Amanda Jordan, Circular Economy Project Manager <amanda.jordan@phoenix.gov>	HDR Kate Bartelt Abigail Fleming Andrea Ramirez

- 1) Has your community reached its 2020 Zero Waste Goal of 40% Diversion? What were the major takeaways you have learned as you aim for Zero Waste by 2040?
 - a) Although the "40 by 20" goal was not met in 2020, Phoenix achieved a higher recycling rate than the national average.
 - b) Phoenix is updating its Zero Waste Plan to achieve zero waste by 2050. The new plan will incorporate learnings from the first plan and is designed to fit the unique community's practices. Amanda is expecting to have the draft done in April.
 - c) After several years and practice, the council realized that 40 by 20 was not a realistic goal, but it was ambitious. The City wants to have achievable goals and plans for the next plan.
 - d) For the next plan, they are looking at what has already been successful, what else they can add in, and then building the program around that
 - e) 40 by 20 was very focused on waste diversion (achieving a specific percentage) rather than the big picture of waste diversion, management, and reduction. In the next plan, the council plans to broaden the vision on what they want to accomplish– marrying a circular economy and zero waste.

- 2) Has Phoenix defined the term "Zero Waste," and how is waste measured?
 - a) The term "Zero Waste" has not been defined; it is very flexible. The City wished to work through a circular economy lens to define Zero Waste in the next plan.
 - b) In the 20 by 40 Plan, waste is being measured by what is going across the scale, including single-family residential waste and what the City directly handles.
 - c) The City has a different make-up now than the 20 by 40 Plan development. The new City Council is looking to change how waste is measured for a more accurate diversion rate in the new plan.
 - d) Measurement of Progress
 - i) There is nothing standardized yet. They are exploring programs/software
 - ii) They use economic development metrics for circular economy progress

- 3) What programs have you found to be most successful in reducing waste generated?
 - a) Reimagine Phoenix has been very successful in the community, emphasizing reducing, reusing, recycle. An incentive called "SAY R&R" (Save As You Reduce and Recycle) was implemented; if a resident chooses to downsize their garbage container for a larger recycling bin, the resident saves money.



- b) Phoenix is planning to add an expanded curbside green organics program that includes a separate yard waste cart. They are currently still in the program's pilot phase and will need more trucks and drivers to expand.
 - c) The North Gateway MRF has been upgraded to receive more recyclables and improve recycling. The 27th Avenue MRF is in the process of being renovated.
 - d) On the circular economy side, the City of Phoenix works with ASU and other internal staff to help plan and build out the Resource Innovation Campus (RIC).
- 4) How long did it take to develop the Zero Waste Plan?
- a) The 40 by 20 goal and plan took about a year to develop with the help of ASU. There were no pushbacks or large projects that were difficult to comprehend. The hardest part was internal management, which changed the internal management structure – now a circular organization style.
 - b) This project moved the City's solid waste division from a behind-the-scenes solid waste collections and processing provider to a front-facing community leader, driving policy changes and working on resource management.
- 5) What policies/legislative actions have you used to reach your Zero Waste goals? How has the state law that bans the regulation of single-use plastic affected your zero-waste plan?
- a) There have been no legislative actions. The state has a "no bans" ordinance which makes all activities through the community voluntary.
 - b) Incentives such as reducing the size of personal garbage cans through SAY R&R have increased voluntary recycling actions. More incentives are being explored in the updated Zero Waste Plan development.
 - c) They do have code enforcement and education/outreach.
 - d) They also look for partnerships to help them accomplish goals.
- 6) Did you consider environmental justice in developing your Zero Waste Plan, and how/did it impact your programs?
- a) Yes, public works are triple bottom lined focused; however, EJ is not highlighted as well as they want them to be in the next version. The City is looking for the next version of the plan to be the next steps in making progress and integrating with the City's climate action plan
- 7) How is your zero-waste program funded? How are those markets working?
- a) An enterprise fund –residential fees for service, tipping fees and revenues from recycling
 - b) Grant funding
 - c) Ppartnerships with other entities that receive funding
- 8) Do you perform an annual zero-waste report to present how well the program went over the past year?
- a) Phoenix has not in several years but will be to create the 2050 road map. The plan will release a public-facing 5-year reporting vision and annual accomplishment reports.
 - b) The council plans to implement data recoding metrics to trend revenues, money raised, and patents filed. They are currently looking for data management solutions.
- 9) Final thoughts
- a) Advice
 - i) Know your identity – communities are unique, but there is no need to reinvent the wheel
 - ii) Make sure the policymakers are in lockstep with staff on vision, goals, reporting



- iii) Make sure the community and stakeholders are engaged early and often
 - iv) Stay realistic (40 by 20 Plan was ambitious)
 - v) Internal procurement – make sure expectations of a partner are realistic. There have been long term, high feedstock requirements requested by some entities considered for the Resource Innovation Campus.
 - vi) Find opportunities to cross collaborate between city departments (Remove silos) and to be aware of what other departments are doing. Amanda works between Community and Economic Development and Public Works.
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Meeting Minutes

Project:	Tucson Zero Waste Roadmap	
Subject:	Task 3: Aspirational Program Interviews – Oregon Metro	
Date:	Tuesday, March 29, 2022	
Location:	Conference Call	
Attendees:	Oregon Metro Luis Sandoval, Senior Solid Waste Planner < Luis.Sandoval@oregonmetro.gov >	HDR Abigail Fleming Andrea Ramirez

- 1) How much does Metro collaborate with the cities and counties in the region when regional and city-level plans are developed? How does this affect diversion goals?
 - a) The state of Oregon assigned Metro the responsibility to have an over-arching plan for the three counties.
 - b) Metro sets the baseline for regulatory plans that the cities and counties under their authority need to follow and use as the base for their own plans. Metro works with the counties and cities on specific mandates to see what would be most beneficial given the diversity of the region. The Regional Waste Plan 2030 was developed by Metro through large community outreach programs to learn the best methods of practice.
 - c) Cities and Counties develop their own sustainability and climate change plans which can sometimes have higher standards than those set by Metro. Most Cities and Counties have an internal waste plan and/or develop an annual waste plan with the help of Metro.
 - d) Metro is the only regional government agency in the country that is comprised of elected officials.
 - e) The Climate Action Plan and Waste Equity Work Plan are developed by cities and counties that are separate from the Regional Plan. Metro owns and operates transfer stations and regulates private transfer station. It does not do collection; only cities and counties collect through franchise agreements with or licenses to private collection companies. Metro can mandate what minimum service standards are required to be provided in its region, such as mandatory business recycling.
 - f) Metro works with local governments to create annual plans, but those are not made available to the public (they are public documents, but not posted on websites or promoted). Metro uses IGAs between Metro and local jurisdictions in order to distribute funding to the local jurisdictions. Funding uses include outreach to single family/commercial/multifamily customers on waste prevention, composting, etc.
 - i) Funding is how metro incentivizes participating in the regional waste plan outside of the boundary where it has jurisdiction
 - ii) *Luis to send Portland waste reduction plan*
 - g) Metro waste goals are minimum; cities can go above and beyond; Portland definitely is more involved.

- 2) Did you consider using the term zero waste?
 - a) Zero Waste was considered in the early stages of pre-planning, however, staff did not like the implication of the possibility of completely eliminating waste (true zero waste is an

unattainable goal). It was also found that using terms such as “waste” in general was not approachable to the average person, who understood the term “garbage” better.

- 3) How long did it take to develop the 2030 Regional Waste Plan?
 - a) The pre-planning process took about a year to prep for the actual development of the plan.
 - i) They used a power mapping analysis to identify groups to reach out to that typically don't participate and whose voices aren't heard often. They were not able to successfully recruit all groups identified due to time constraints.
 - b) The development of the plan took 2 years (March 2017 to March 2019). This time was spent setting goals and communicating with the organizations on what would work best.
 - i) During phase 1, Metro was making connections and relationships with community organizations which they would benefit from during the development and roll out of the Regional Waste Plan. They developed the engagement terms for using the community organizations.
 - ii) Metro worked with 8 community organizations to incorporate the diversity and the different needs throughout the region. They recruited people from within the communities they serve. Metro set up contracts with community organizations to recruit participants and lead discussions with them to provide feedback for the regional plan.
 - iii) Stipends (gift cards) were given by the community organizations Metro contracted with to the community members to compensate their participation in the Regional Waste Plan. Metro contracted directly with the community organizations and paid for their facilitation and consulting services, as well as the stipends to be given to community members who participated in the process.
 - iv) Stipends were given to individuals participating in the outreach/feedback sessions organized in conjunction with the community organizations and Metro. About 100 people total participated.
 - c) They hired a facilitator to coordinate outreach and the community organizations and work to overcome distrust from those groups.
 - d) There was a lot of learning, which took time
 - e) They had to introduce community members to the waste management system and goals. They would have liked to have been able to start that earlier in the Regional Waste Plan development process.

- 4) Have you had any challenges developing the annual progress report?
 - a) The main issue was the capacity and staffing for the development of the plan due to the pandemic. Although Metro has been responsible for waste diversion since the 70's, producing the annual report was the first time under the new framework.
 - b) The first progress report took approximately a year to develop. Throughout the year, stakeholders were still narrowing down certain indicators they wanted to report and needed to collect the data to support. Another challenge Metro had to overcome with the first progress report was developing new data sources for some indicators. For other indicators, Metro used existing data already regularly collected by state agencies, cities, counties and Metro.
 - c) Over the year they had approximately four staff members working on the report, not full time, so it would be approximately the equivalence to two full time employees.
 - d) Waste characterization is not planned to be a part of the annual progress report as the study is conducted statewide every 6 years for garbage. Metro pays for an additional recycling

- characterization study that they can report, which is facility-based for residential and commercial, and generator-based for multifamily. Their goal is to provide data every 3-5 years because it is an indicator in the Regional Waste Plan.
- e) A large focus of the Regional Waste Plan is on the multifamily sector when it comes to access to services because historically, they have been neglected.
 - i) The focus is not so much on diversion, but on basic quality and access to services, including garbage, mixed recycling and glass recycling (glass is collected separately). Since at least 2017, Metro has found that many multifamily sites in the region lack adequate recycling service, as in, not enough bins for people to place their recyclables, which leads to overflowing bins and lower material quality.
 - f) Metro gets reports from the MRFs serving the region. Anyone collecting recycling also has to send reports to ODEQ.
- 5) Were there any challenges with incorporating input from stakeholders, such as disagreements on goals or definitions, during development of the Plan?
- a) Agreeing on definitions was a challenge. One challenge between stakeholders was the clarification between a goal and an indicator; what were measurable goals/targets they could track and report. This lack of consensus led to an absence of set targets in the final plan.
 - b) Another challenge with the roll out was that in trying to keep everything high level, they did not incorporate anything specific about what facilities existed, needed to be built, or needed to be updated to facilitate the new goals. To remedy this, they are currently working on a separate Systems Facilities Plan, which will be considered a companion document of the Regional Waste Plan at first, and maybe incorporated into the next update of the Regional Waste Plan later (not sure at this point).
 - c) There were debates about how much programs were going to cost
 - d) The previous 64% recovery goal used to be a mandatory goal which then turned into a voluntary target with passage of a bill in 2015 by the Oregon legislature, which became effective Jan. 1, 2018.
 - e) They have regional indicators, but not specific for jurisdictions. There are no current targets that people are aiming for (except for the regional 64% recovery rate, which includes recycling, composting and energy recovery); some individual cities do have targets for waste reduction.
- 6) What policies/legislative actions have you used to reach your Zero Waste goals?
- a) Opportunity to Recycle Act - main driver for programs, metro is required to have a waste reduction plan.
 - b) Business Recycling and Food Waste Collection Requirements
 - i) The more recent of these is mandatory commercial food waste collection, which is likely to have a positive impact on recovery (program implementation was delayed. It was supposed to begin in 2020, but because of COVID, it started to be implemented in March 2022).
 - c) Clean Fuel Program
 - i) Hasn't seen evidence this has had a noticeable impact on solid waste fleets.
 - ii) The effect of this program would be mainly on garbage trucks and long-haul transport.
 - iii) There have been other policies and requirements implemented by individual jurisdiction's, such as [Portland's requirements on collection vehicles](#) and [Metro-owned transfer stations switching to renewable diesel](#) for the long-haul transport of waste to the Arlington landfill (~130 miles away).



- d) Oregon's Plastic Pollution and Recycling Modernization Act – passed by legislation but rules are being developed, so not a factor yet.
- 7) Can you share any lessons learned from incorporating equity and environmental justice into your planning process?
- a) Engagement summary outlines more in detail about what they did for outreach.
 - b) The Equity Work Group members focused mainly on racial equity and environmental justice, they did not necessarily have any background in waste. They worked with the planning team to come up with the principles in the Regional Waste Plan.
 - c) The Equity Work Group helped the Metro project team take into consideration and include things in the final Regional Waste Plan that would not have included without the EWGs close collaboration.
- 8) How are programs funded?
- a) System Fees/Excise Tax on garbage and other waste but not on recycling, applied at transfer stations or landfill (both public and private facilities).
 - i) Metro has tax authority over solid waste, including garbage and recycling, but exempts recycling from taxes and fees as a way to incentivize recovery.
 - b) System Fees/Excise Taxes are lower on food waste and wood/compostables than on garbage.
 - c) Cities have their own franchise fees.
 - d) Systems fee is what funds a lot of the waste reduction programs:
 - i) Funds household hazardous waste program, school outreach
- 9) Other insights or advice for the City of Tucson?
- a) Cannot rush the engagement step.
-