1 Development of the 2022 Solid Waste Plan Update

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Chapter 1 Development of the 2022 Solid Waste Plan Update

Overview

Guided by zero waste principles since at least 1998, the City of Seattle has built a reputation as an international leader in solid waste management. Among many achievements, Seattle has reduced City waste generation and disposal to a landfill and increased recycling and composting despite tremendous population growth. Seattle can credit its pace-setting role to public support for new and environmentally focused programs and policies combined with Seattle Public Utilities' (SPU's) thoughtful planning. The City's newest solid waste comprehensive plan, the *2022 Solid Waste Plan Update: Moving Upstream to Zero Waste* (*2022 Plan Update*), represents another step forward on the path toward zero waste.

The *2022 Plan Update* reflects Seattle's increased emphasis on eliminating or minimizing waste from the start. Using frameworks that consider the entire life cycle of materials, from extraction of natural resources to final disposal, the City is working to identify opportunities for preventing waste as early or as far "upstream" in that life cycle as possible to reduce environmental and health impacts.

This chapter provides background on the development of the *2022 Plan Update,* including context for Seattle's increased emphasis on eliminating or minimizing waste from the start. Specifically, this chapter discusses:

- Progress implementing recommendations from the *2011 Solid Waste Plan Revision*
- New key laws and policies affecting solid waste management since the *2011 Solid Waste Plan Revision*

Materials Lifecycle Perspective Graphic (Source: EPA)

- Material sustainability and responsible recycling frameworks that Seattle is using to place greater emphasis on approaches that prevent waste in the first place
- Goal areas that guide the *2022 Plan Update's* approach to solid waste management, with special emphasis on supporting racial equity in Seattle and resiliency of the solid waste management system
- A recommendation for making racial equity central to solid waste planning
- Collaborators who helped develop the recommendations in this plan and who will be responsible for implementing it
- SPU's process for developing the *2022 Plan Update* recommendations based on qualitative and quantitative data analysis and stakeholder input
- Improving measurement of waste prevention and reduction efforts, environmental impacts, and program performance

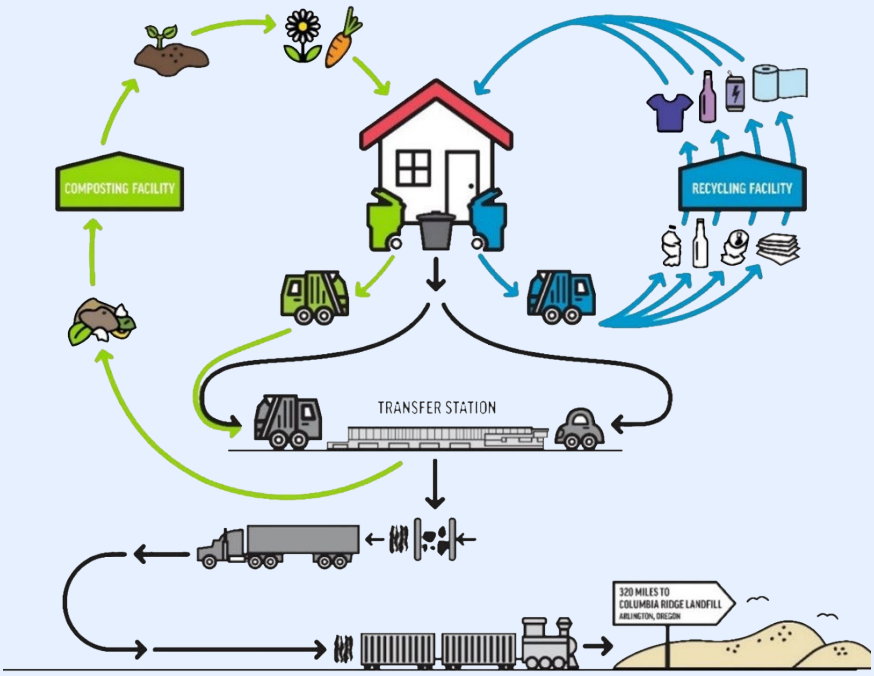
Food waste collection bags ready for Clear Alleys Program collection service next to public space waste containers (Source: SPU Image Library)

In Brief: Solid Waste Management in Seattle

Seattle Public Utilities provides high quality solid waste services that promote public health and safety, quality of life, and environmental stewardship. In 2020, Seattle's solid waste system handled more than 700,000 tons (1.4 billion pounds) of recycling, composting, and garbage created by the City's residents, workers, and visitors. Construction and demolition projects in Seattle generated another 560,000 tons (1.12 billion pounds) of solid waste.[1]

SPU manages contracts with private companies who collect recyclables, compostable materials, and garbage from residential and nonresidential customers. Recycling and composting materials are taken to processing facilities. The contractors deliver garbage to SPU's transfer stations where, along with waste from self-haulers and small contractors, it is compacted and put in sealed shipping containers, which are then transported by rail to a privately-owned regional landfill in eastern Oregon for final disposal.

The City owns and operates two transfer stations, two household hazardous waste facilities, a fleet of trucks and heavy equipment, and several closed landfills. The Solid Waste Capital Improvement Plan (CIP) supports the transfer stations, heavy equipment, and post-closure projects on landfills previously used by the City.



Seattle's solid waste system from the residential perspective (source: Seattle Public Utilities)

Along with waste handling and disposal activities, the Solid Waste Utility within SPU engages its customers in environmental sustainability programs and policies that promote waste prevention, recycling, and composting. SPU also works to keep Seattle clean by targeting illegal dumping, supporting community cleanups, and providing public litter and recycling cans across Seattle.

[1] Seattle Public Utilities, "Just the Facts – 2020," 2021, https://www.seattle.gov/documents/Departments/SPU/AboutUs/SPU-Just_the_Facts.pdf.

Plan Organization

The *2022 Plan Update* contains 10 chapters that describe different elements of Seattle's solid waste planning and system. Within the chapters, Seattle offers 39 recommendations for solid waste programs and policies, as the City continues to pursue environmental, economic, and social goals. Chapter contents are described below:

1. **Development of the 2022 Solid Waste Plan Update** provides an overview of how Seattle created the *2022 Plan Update* and the recommendations to implement in the next six years.
2. **Maximizing and Measuring Impact** describes Seattle's increasing emphasis on preventing waste in the first place and adjusting solid waste goals accordingly.
3. **Solid Waste Data and Trends** describes Seattle's data-driven approach to waste management and summarizes the factors that influence waste generation. It also presents historic waste trends, composition data, and forecasts for waste generation and recycling.
4. **Waste Prevention and Reuse** describes Seattle's work to reduce the amount of waste generated through food waste prevention, reducing single-use items, industry and community partnerships, natural yard care, reuse, and other efforts.
5. **Recycling and Composting Policy and Markets** describes the policies that define what materials must be collected for recycling and composting in Seattle, the impacts of and Seattle's actions to ensure access to recycling markets, and the role of extended producer responsibility and voluntary product stewardship in Seattle's solid waste system.
6. **Solid Waste Handling, Collection, and Removal** describes the system to collect solid waste from residential, commercial, and self-haul customers and to address litter and illegal dumping. It also briefly describes SPU's hazardous waste drop-off sites.
7. **Solid Waste Transfer, Processing, Disposal, and Emergency Management** describes how collected solid waste is transferred to and managed at recycling and compost facilities or at the landfill that accepts discarded material for final disposal. It also describes Seattle's plans to manage waste during emergencies.
8. **Construction and Demolition (C&D) Debris** describes Seattle's policies to encourage prevention, reuse, and recycling of C&D debris. It also describes the collection, processing, and disposal system for C&D debris generated in Seattle.
9. **Outreach, Education, Enforcement, and Compliance Support** describes how SPU communicates with its customers, uses outreach and education to promote waste prevention and recycling, and supports compliance with Seattle solid waste codes and contracts.
10. **Administration and Financing of the Solid Waste System** describes how Seattle administers and finances solid waste services and facilities and details current and projected revenues and rates.

Planning Background

The *2022 Plan Update* updates Seattle's *2011 Solid Waste Plan Revision: Picking Up the Pace Toward Zero Waste* (*2011 Plan Revision*), which City Council adopted in 2013. The *2022 Plan Update* builds on the momentum created by the successful implementation of many of the recommendations in the *2011 Plan Revision* and the lessons learned from the recommendations that SPU could not implement.

Prior to the *2022 Plan Update*, the *2011 Plan Revision* proposed 116 recommendations to enhance solid waste management in Seattle. SPU has studied, is on track to complete, or has implemented all 116 of those recommendations. In addition to the top accomplishments highlighted below, Seattle has continued to evaluate and improve its customer programs; incentivize diversion; conduct outreach, education, and enforcement efforts; engage in an ongoing regional partnership to improve recycling quality; and provide essential collection, processing, transfer, and disposal services to Seattle residents and businesses. Appendix A, *Planning History and Progress on Prior Recommendations,* documents the status of all 116 recommendations from the *2011 Plan Revision*.

Top Accomplishments Since the *2011 Plan Revision*

Waste prevention

- Offered junk mail and yellow pages directory opt-out services to reduce paper use, which noticeably reduced Seattle's waste and recycling quantities.
- Passed a local plastic bag ban that reduced the use of plastic bags, increased the use of reusable alternatives, and served as a model for other cities in Puget Sound and beyond.

Recycling quantity, quality, and access

- Helped pass a statewide law to reduce contamination in compost by making it easier for consumers to tell compostable and non-compostable packaging apart.
- Implemented universal multifamily food and yard waste collection service to encourage composting of food waste and compostable food packaging for these residents.
- Added food waste and compostable paper to single-family and commercial food and yard waste disposal bans to increase diversion of compostable materials from landfill.
- Banned disposal of plastic film in construction and demolition debris.
- Banned disposal of asphalt, bricks, and concrete paving at construction jobsites and City and private transfer stations.
- Banned disposal of clean wood at construction jobsites and private transfer stations.

Policy solutions for problem waste materials

- Supported development of the regional manufacturer-financed Secure Medicine Return program that provides secure ways to dispose of unwanted medications, prevents them from polluting waterways, and reduces accidental poisonings and drug abuse. Effective 2021, this program is now offered statewide as the Safe Medicine Return Program.
- Played a key role in creating a manufacturer-financed paint recycling take-back program for Washington State.
- Helped pass a statewide extended producer responsibility law creating a recycling take-back program for mercury-containing lighting.

Solid waste system operations

- Rebuilt both the North and South Transfer Stations to increase the size and flexibility of both facilities; met LEED Gold standards at both new facilities with green energy, water, and stormwater infrastructure; improved safety, odor control, noise control, and improved traffic flow; and added education and public access areas to enhance community access and improve service to customers.
- Added a recycling facility at the North Transfer Station to provide convenient options to divert recyclable or reusable material from landfill.
- Developed and awarded new collection and recycling processing contracts that include innovative provisions, such as a requirement to use electric or renewable-fuel vehicles in support of Seattle's climate action goals.

Plan Development

Building on the *2011 Plan Revision,* the *2022 Plan Update* considers new developments in the solid waste industry and in social, environmental, and economic concerns over the past 10 years. The following sections provide background on how Seattle developed the *2022 Plan Update*. These sections detail:

- Regulations, policies, and related plans with which the *2022 Plan Update* aligns
- Material sustainability and responsible recycling frameworks that inform solid waste management in Seattle
- Government entities, the Solid Waste Advisory Committee, other community members, and interest groups interested in solid waste management with whom Seattle collaborated to create the *2022 Plan Update* and who have responsibility for authorizing or implementing it

Regulations, Policies, and Related Plans

The *2022 Plan Update* must comply with solid waste planning requirements outlined in the Revised Code of Washington (RCW) and provide a roadmap for solid waste management and facilities in Seattle for the next six years, with an outlook toward the next 20 years. Various state and local regulations, guidelines, and plans influence Seattle's solid waste planning. Because many of these documents have been amended since Seattle's *2011 Plan Revision,* SPU reviewed them for potential impacts on the solid waste system, including:

- Seattle's *Climate Action Plan* (2013)
- *Washington State Contamination Reduction and Outreach Plan* (2020)
- Seattle Public Utilities' *Strategic Business Plan* (2021—2026)
- Washington's *State Solid and Hazardous Waste Plan: Moving Washington Beyond Waste and Toxics* (2021)

The following sections detail these four key plans.[2]

[2] SPU also reviewed other plans and regulations, including Seattle's Comprehensive Plan, to determine that they align with or do not alter SPU's Plan or current programming. These appear in Appendix C, *Plans and Regulations Consulted*.

Seattle's Climate Action Plan

Seattle's *Climate Action Plan* focuses on City actions that reduce greenhouse gas (GHG) emissions while supporting vibrant neighborhoods, economic prosperity, and social equity.[3][4] Actions focus on three areas of greatest need and impact: road transportation, building energy, and waste. In the area of waste, the Climate Action Plan explains why the waste sector is important for reducing emissions and outlines a set of actions to achieve by 2015 and 2030, respectively, to help achieve the City's goal of a 58% reduction in GHG emissions by 2030.

The Climate Action Plan organizes actions around reducing emissions from waste into three categories: 1) waste reduction and product stewardship, 2) recycling and composting, and 3) collection, processing, and disposal. The Climate Action Plan, for the first time in the city's history, drew attention to GHG emissions associated with waste and offers actions for how to reduce or avoid them. Further discussion of SPU's efforts to measure GHG emissions from waste appears in Chapter 2, *Maximizing and Measuring Impact: Moving Upstream Beyond the Recycling Rate*.

Washington State Recycling Contamination Reduction and Outreach Plan (CROP)

In 2019, Governor Inslee signed House Bill 1543 into law to improve recycling quality. The act required Ecology to "create and implement a statewide recycling contamination reduction and outreach plan based on best management practices." The State's contamination reduction and outreach plan provides guidance to help local jurisdictions examine contamination in their recycling programs and to develop local contamination reduction and outreach plans.[5] As a city with its own solid waste management plan, Seattle created a contamination reduction and outreach plan by July 1, 2021. Seattle's contamination reduction and outreach plan appears in Appendix B, *Contamination Reduction & Outreach Plan*.

[3] http://www.seattle.gov/Documents/Departments/Environment/ClimateChange/2013_CAP_20130612.pdf
[4] City of Seattle, "Climate Action Plan," June 2013, www.seattle.gov/Documents/Departments/Environment/ClimateChange/2013_CAP_20130612.pdf.
[5] Washington State Department of Ecology, "Washington State Recycling Contamination Reduction and Outreach Plan (CROP)," September 2020, apps.ecology.wa.gov/publications/documents/2007021.pdf.

Seattle Public Utilities' Strategic Business Plan

SPU's *2021–2026 Strategic Business Plan* (SBP) sets the priorities of the utility and contains a three-year rate path designed to provide customers with predictable rates while ensuring long-term sustainability and excellent utility services.[6] SPU revisits the *Strategic Business Plan* every three years to adjust the rate path, if necessary.

The SBP includes SPU's vision and mission statements and describes the desired outcomes for its customers as well as strategies to achieve these outcomes. The *Strategic Business Plan* also outlines SPU's guiding principles, along with four focus areas for the utility: 1) delivering equitable essential service; 2) stewarding environment and health; 3) empowering our customers, community, and employees; and 4) strengthening the utility's business practices. This *2022 Plan Update* echoes these guiding principles.

Our Mission:

Seattle Public Utilities fosters healthy people, environment, and economy by partnering with our community to equitably manage water and waste resources for today and for future generations.

Our Vision:

COMMUNITY Centered,
ONE Water, ZERO Waste

CARES Principles:

Customers and Community
Affordability
Risk and Resilience
Equity and Empowerment
Service and Safety

Washington State Solid Waste Plan

In 2021, the Washington State Department of Ecology (Ecology) updated the *State Solid and Hazardous Waste Plan*, subtitled *Moving Washington Beyond Waste and Toxics*.[7] The state's plan uses a sustainable materials management approach like the U.S. Environmental Protection Agency and the Oregon Department of Environmental Quality, explaining, "By managing materials that become waste through all stages of their life cycle, we are best able to reduce harmful environmental, health, and climate effects." Sustainable materials management is discussed in more detail later in this chapter on page 1.13.

State priorities are to mitigate climate change through reducing waste, focus upstream on manufacturing and use, reduce toxic threats in products and industrial processes, and maximize the effectiveness of recycling systems (see Figure 1.1). SPU's plans to address these priorities

[6] Seattle Public Utilities, "2021–2026 Strategic Business Plan," 2021, www.seattle.gov/Documents/Departments/SPU/AboutUs/SBP_2021-2026.pdf.
[7] Washington State Department of Ecology, "State Solid and Hazardous Waste Management Plan," 2021, ecology.wa.gov/Regulations-Permits/Plans-policies/Washington-state-waste-plan.

are described throughout this *2022 Plan Update*, particularly in Chapter 3, *Seattle Waste Data and Trends*, and Chapter 4, *Waste Prevention and Reuse*.

Figure 1.1 Washington 2021 Statewide Solid Waste Plan Vision and Priorities

Source: Ecology, "2021 State Solid and Hazardous Waste Management Plan"

Related to the State's priorities on focusing upstream, beginning in 2019, Ecology de-emphasized the recycling rate as a primary measure of progress in favor of lowering waste generation.[8] Waste reduction generally results in lower GHG emissions than recycling and other waste management scenarios. The State has also set a quantitative goal to reduce food waste by 50% by 2030, compared to 2015. Seattle supports Ecology goals and plans to expand its metrics beyond the recycling rate to better measure waste prevention and the environmental benefits and impacts of solid waste in Seattle.

Other Related Plans and Regulations

SPU also reviewed changes in other related plans and regulations and determined that they align with or do not alter Seattle's current programming or *2022 Plan Update*. These plans and regulations are listed in Appendix C, *Plans and Regulations Consulted*.

[8] Washington State Department of Ecology, "Changes in Washington State's Solid Waste Metrics—FAQ," April 2019, www.ezview.wa.gov/Portals/_1962/Documents/Water2Resources/SWAC19-05MetricsChangesFAQ.pdf.

The next section discusses the frameworks guiding solid waste planning and management in Seattle. A life cycle perspective underlies many of these frameworks and helps Seattle understand how materials are used and how they impact people and the environment.

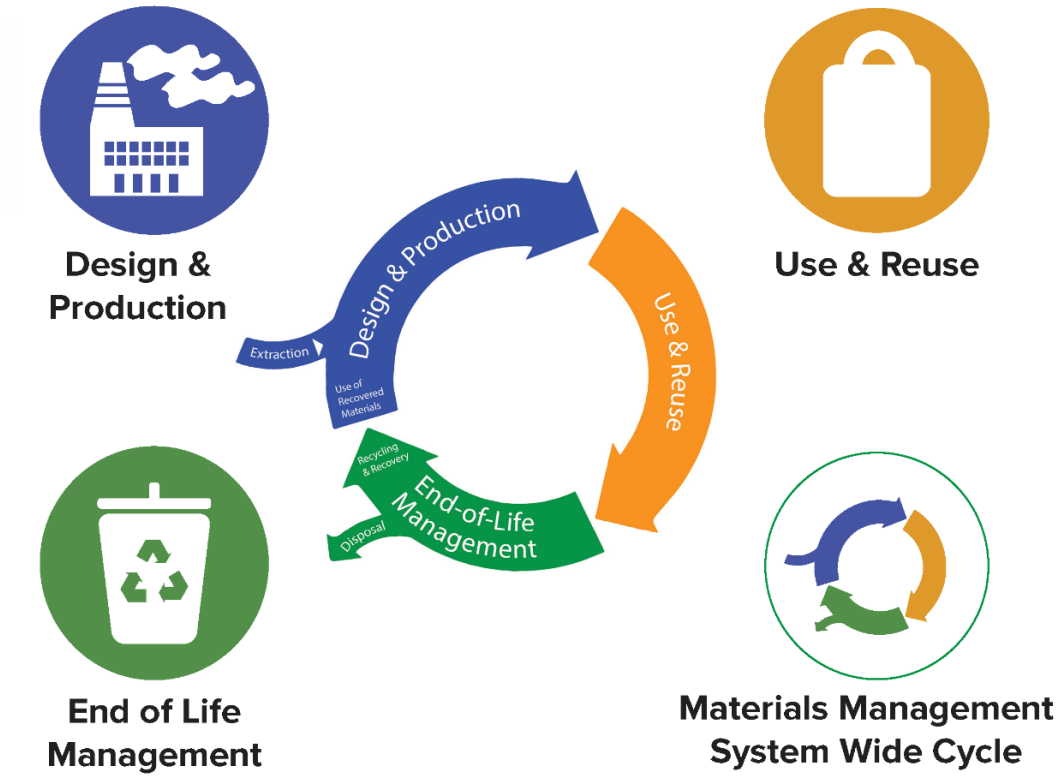
Material Sustainability and Responsible Recycling Frameworks

For 30 years, Seattle has sought to examine externalities, considering greenhouse gas emissions reductions, and other environmental and public health impacts to make decisions around solid waste management. For example, SPU has historically used life cycle assessment as a decision-making tool. Life cycle assessment is a technique used to quantitatively evaluate environmental impacts associated with some of (or ideally all) the stages of a product's life from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recovery.

Increasingly, Seattle has focused on minimizing waste further upstream in the life cycle of a given material to reduce its environmental and human health impacts. Instead of focusing on end-of-life management of waste such as recycling or disposal, Seattle and other solid waste industry leaders, like the EPA, the Oregon Department of Environmental Quality, and the Washington State Department of Ecology, have shifted toward considering the impacts of the full life cycle of materials used to make products and packaging.

A life cycle view of materials considers the environmental and social impacts, such as climate-changing GHG emissions and their impacts on communities, throughout the entire life cycle—not just at the end of it. A material's full life cycle includes material design; extraction of raw materials or reuse of recovered materials; material production and transport; material use and repair; and end-of-life management of materials. With a wholistic view of materials, Seattle's evolving approach to waste management places even more emphasis on preventing waste in the first place to minimize environmental and social impacts of waste.

Figure 1.2 Materials Management Life Cycle



Source: Ecology, "2015 State Solid and Hazardous Waste Management Plan"

Several material sustainability frameworks that reflect this life cycle approach inform Seattle's circular view of materials and growing emphasis on waste prevention and minimizing environmental impacts. Though they contain overlapping elements, each framework offers a slightly different and useful perspective. The following sections describe key material sustainability frameworks that inform Seattle's solid waste strategies.

Sustainable Materials Management

Sustainable materials management aims to minimize negative health and environmental impacts of materials along their entire life cycle including design, manufacturing, and use—not just end-of-life (see Figure 1.2). With a sustainable materials management framework, solid waste planners look not only at recycling and disposal issues, but also at ways to use less energy, water, and toxics during material production and use because the environmental impact of upstream activities is often greater than that of waste management downstream. This framework reflects a gradual shift in approach and priorities underway in the solid waste management industry to identify and address the global and broad environmental impacts that the full life cycle of materials has on the planet.

Since 2015, Ecology has used sustainable materials management as a framework in statewide solid waste planning to reduce waste and toxics.[9] Seattle's *2022 Plan Update* similarly aligns with materials frameworks that consider the entire life cycle of materials. Seattle follows trends in both the upstream and downstream portions of the material management life cycle. Upstream examples include shifts toward lighter-weight packaging materials in the processing and manufacturing stage, and the impact of fast fashion and online retail growth on overall waste generation in the use or consumption stage. These types of changes in the marketplace inform Seattle's development of waste prevention strategies and actions.

Source: Ecology, "2015 State Solid and Hazardous Waste Management Plan"

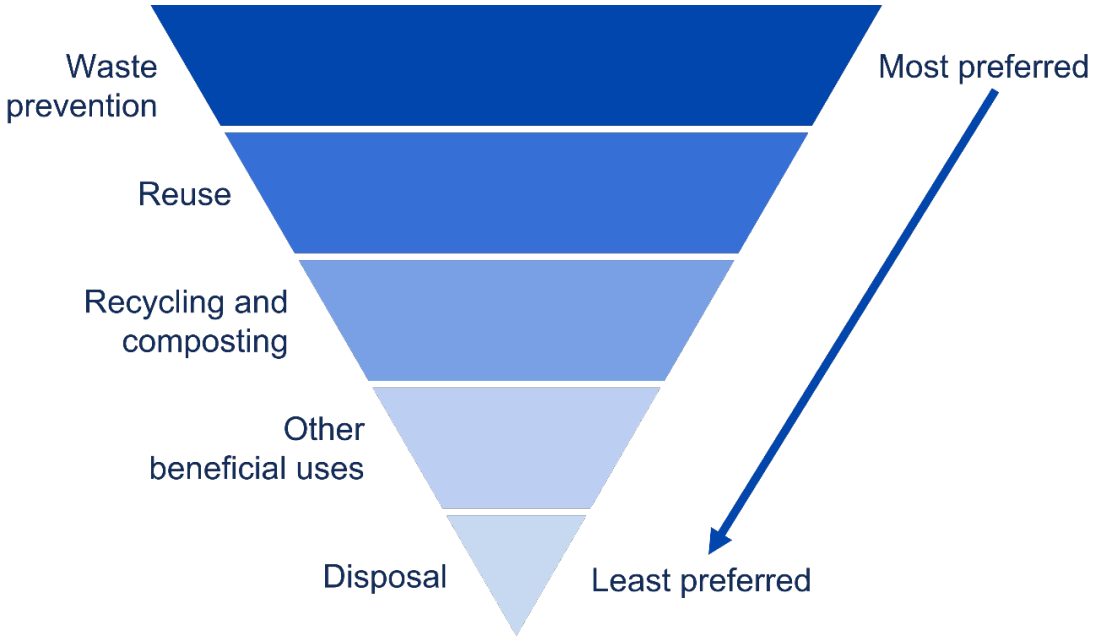
[9] Washington State Department of Ecology, "The State Solid and Hazardous Waste Plan: Moving Washington Beyond Waste and Toxics," June 2015, fortress.wa.gov/ecy/publications/documents/1504019.pdf.

The Waste Management Hierarchy

The sustainable materials management framework was built on the waste management hierarchy, which ranks materials management strategies from most to least environmentally preferred. This hierarchy aligns with the sustainable materials management framework, emphasizing waste prevention as the preferred option for minimizing impacts associated with resource extraction and materials production and use.

There are many versions of the waste management hierarchy. The United States Environmental Protection Agency (EPA) hierarchy prioritizes waste prevention (including source reduction and reuse) first.[10] Washington has adopted a similar waste management hierarchy, codified in RCW 70A.205.005, which defines the solid waste management goals and priorities for the State.[11] Like Ecology and the EPA, Seattle has increasingly prioritized waste prevention and reuse as the key strategy to reduce the impacts of materials on the environment and human health. Seattle's priorities for managing solid waste, aligned with state and federal priorities, are shown in Figure 1.3.

Figure 1.3 Solid Waste Management Hierarchy



Source: Cascadia Consulting Group for Seattle Public Utilities, aligned with Ecology and EPA hierarchies

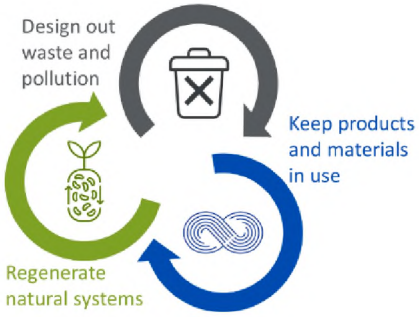
[10] U.S. EPA, "Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy," n.d., Accessed October 2021, www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy.
[11] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.205.005

Ecology also developed a hierarchy specific to food, yard, and wood waste management. Waste prevention (labeled as "source reduction" in Ecology's organics management hierarchy) is the most preferred method. The next management strategy is feeding people, feeding animals, onsite food and yard waste management, such as backyard composting, offsite food and yard waste management including large-scale commercial composting, and landfill or incineration disposal, both with and without energy recovery.[12]

Outside of the formal waste management hierarchy, solid waste can escape into the environment through improper disposal such as litter, illegal dumping, open burning, and marine debris. Even waste that is originally managed properly can escape during transport, disposal, or recycling and create environmental impacts. Managing waste within the hierarchy and minimizing improper disposal is an important part of meeting environmental goals, reducing impacts of waste management activities, mitigating unintended consequences, such as from plastic pollution, and ensuring materials end up in their highest and best use when they are discarded.

Circular Economy

Circular economy is a newer framework related to sustainable materials management. A circular economy is an alternative to a traditional, extractive linear economy (take → make → dispose) that instead keeps resources in use for as long as possible by designing out waste and regenerating natural systems. In a circular economy, end waste products become inputs for new production. The concept of circular economy has been advanced and popularized by the Ellen MacArthur Foundation and applied in its New Plastic Economy work.[13] The framework has also been adopted by a wide range of business and government interests, including the Seattle Good Business Network.[14]

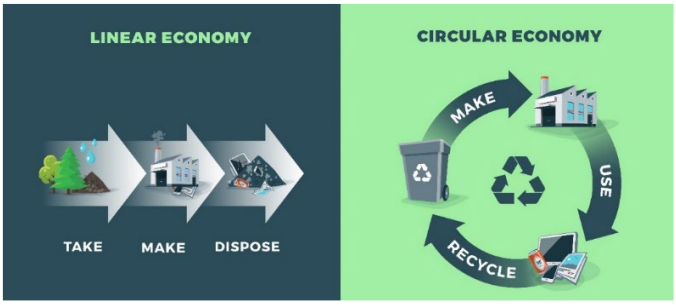


Ellen MacArthur Foundation's principles for a circular economy (Source: Cascadia Consulting Group for SPU)

[12] Washington State Department of Ecology, "Washington State Preferred Organics Management Hierarchy," October 2016, ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Waste-reduction-programs/Organic-materials#gallery.
[13] https://ellenmacarthurfoundation.org/
[14] https://seattlegood.org/

The Ellen MacArthur Foundation notes three underlying principles for a circular economy framework:[15]

1. Design out waste and pollution
2. Keep products and materials in use
3. Regenerate natural systems



Linear compared to circular economy (Source: petovarga, Shutterstock)

In Seattle, glass recycling is an example of a local circular economy: Strategic Materials, Inc.[16] processes glass from Seattle's curbside recycling stream and Ardagh Group, a global supplier of recyclable glass packaging, uses it to manufacture glass bottles.[17] SPU is working to identify and promote opportunities for similar circular material processing models at the local level.

Glass sorted by color for recycling at Strategic Materials, Inc. in Seattle (Source: SPU Image Library)

[15] Ellen MacArthur Foundation, "What is a Circular Economy?" https://www.ellenmacarthurfoundation.org/circular-economy/concept.
[16] https://www.smi.com/
[17] https://www.ardaghgroup.com/

Zero Waste

Where circular economy focuses on minimizing waste through changing product design, manufacture, and recovery, the concept of zero waste takes an even broader view to reduce consumption overall–not just making production more efficient. Like the sustainable materials management framework, zero waste considers the full life cycle of materials while seeking to eliminate—not just minimize—waste. Internationally, the Zero Waste International Alliance defines zero waste as:[18]

> *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.*

To advance zero waste, Seattle adopted the *Zero Waste Resolution* (30990) in 2007 and reaffirmed it in 2012 as part of the *2011 Plan Revision*.[19] The *Zero Waste Resolution* established goals and actions in support of zero waste, including recycling rate targets and a waste prevention goal. With increasing emphasis on waste prevention, Seattle will revisit the goals of the Zero Waste Resolution, which focused on improving recycling.

More recently, SPU has set its own zero waste vision in SPU's *Strategic Business Plan Update (2021—2026)* that focuses on waste prevention and waste reduction:

> *All resources have value, and we strive to waste nothing. We must look at the whole life cycle of materials so we can eliminate waste, prevent pollution, encourage product durability and reusability, conserve natural resources, and ultimately build a circular and inclusive economy.*
>
> *Zero Waste protects health and the environment through the conservation of all resources from production through consumption without burning or pollution to land, water, or air.*

Seattle's commitment to zero waste reinforces its increasing emphasis on waste prevention and minimizing life cycle environmental impacts, not just maximizing the recycling rate. Chapter 2 provides more discussion on how shifting to prioritize waste prevention will impact Seattle's solid waste goals.

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[18] Zero Waste International Alliance, "Zero Waste Definition," 2018, http://zwia.org/zero-waste-definition.
[19] Seattle City Council, "Zero Waste Resolution 30990," June 2007, http://clerk.ci.seattle.wa.us/search/results?s1=&s3=30990&s2=&s4=&Sect4=AND&l=20&Sect2=THESON&Sect3=PLURON&Sect5=RESNY&Sect6=HITOFF&d=RESF&p=1&u=%2F~public%2Fresny.htm&r=1&f=G.

Responsible Recycling

While waste prevention is essential, recycling will remain part of Seattle's waste management system as an option to recover materials used to manufacture new products and reduce the need to extract raw materials to make new products. In the responsible recycling framework, participants in the solid waste system take responsibility for the waste and recyclables they generate so that the recyclables are sorted, processed, and, if necessary, disposed in a responsible manner. In addition, those who generate or collect recyclable materials—such as SPU and its customers—are held accountable for ensuring that the materials they recycle and the recycling process itself do not create harm locally or abroad.

Bales of mixed plastics for recycling (Source: Adobe Stock, Inc.)

A responsible recycling framework also encourages producers and consumers to reduce wasteful packaging and products and to increase the use of recycled and recyclable materials. The goals of responsible recycling in the context of a commingled recycling system are to 1) produce recyclable material that is clean and suitable for remanufacture and 2) ensure that the material does not contribute to environmental pollution or endanger human health or safety.[20] SPU strives to ensure responsible recycling occurs in Seattle. Further discussion of responsible recycling and details of Seattle's involvement in the Responsible Recycling Task Force appear in Chapter 5, *Recycling and Composting Policy and Markets*.

[20] King County Responsible Recycling Task Force, "Recommendations to Achieve a Responsible Recycling System," January 10, 2019, https://kingcounty.gov/~/media/depts/dnrp/solid-waste/about/planning/documents/task-force-final-recommendations.ashx?la=en.

Goal Areas for Solid Waste Management

Along with these sustainability-focused frameworks, Seattle developed seven goal areas for the *2022 Plan Update* consistent with SPU's *Strategic Business Plan Update (2021—2026)* to guide solid waste management in Seattle. The four core focus areas and the CARES principles in the *Strategic Business Plan Update (2021—2026),* as well as citywide sustainability goals, regional trends in solid waste management, and community stewardship interests, are echoed in the seven goal areas of the *2022 Plan Update*, which span all aspects of solid waste management, from waste prevention through disposal:

1. Racial equity: center racial equity in the 2022 Plan Update and provide racially equitable, inclusive, and culturally competent services
2. Affordability: provide services that are affordable, efficient, and cost-effective
3. Environmental impact: minimize global and life cycle environmental impacts of materials and activities
4. Risk and resiliency: plan, adapt, and respond to disruptions, changes, and opportunities
5. Safety: provide services and facilities that are safe, clean, and secure
6. Operational excellence: provide operational excellence in core service delivery
7. Markets: support development of strong and resilient waste prevention, recycling, and composting markets to maximize environmental benefits

Of the seven goal areas, **racial equity** and **risk and resiliency** are especially noteworthy elements of the *2022 Plan Update*. The following sections provide in-depth background on how the city- and utility-wide frameworks around racial equity and risk and resiliency play a role in solid waste planning.

Spotlight on Racial Equity

A key element of the *2022 Plan Update* includes deepening Seattle's commitment to race and social justice. Racial equity is the condition that would be achieved if racial identity no longer predicted, in a statistical sense, how a person fares in society. Equity is the outcome, not just access to opportunity. As one part of racial justice, racial equity includes work to address root causes of inequities. To deliver equitable service, focused approaches for specific communities and waste-generating sectors are needed to meet the City's shared recycling and waste reduction goals, following the principles of targeted universalism.[21] In targeted universalism,

[21] Powell, John a., Stephen Menendian, and Wendy Ake, "Targeted Universalism: Policy & Practice." Haas Institute for a Fair and Inclusive Society, University of California, Berkeley, 2019, belonging.berkeley.edu/targeted-universalism.

Seattle strives to achieve the same universal goal for everyone—so everyone experiences the same desired outcomes—while focusing extra effort on communities who are furthest from that goal and using strategies that are targeted to meet their needs.

Equity is Not Equality

Equality and equity do not mean the same thing. Some communities have had less access to government services and economic opportunities based on race, disability, and income.

As an example, "equal" means all SPU customers are eligible for a rebate program. Equity means Seattle understands that some customers cannot pay for the upfront costs of the rebate program. When Seattle uses an equity lens, we look at the complete picture of a customer or a community. Seattle plan and focus its resources to provide real access and opportunity for all.

The Race and Social Justice Initiative (RSJI) is the City of Seattle's commitment to realize the vision of racial equity.[22] RSJI is a citywide effort with a vision of ending individual racism, structural racism, and institutional racism in City government and to eliminate racial inequity in Seattle. Consistent with RSJI, SPU is committed to eliminating race-based disparities in its services. These disparities may occur in access to service, education, and opportunities to provide input and make community priorities heard, among other areas. Communities of particular interest to SPU include people of color; low-income individuals; immigrant, refugee, and indigenous people; and people who speak Seattle's first tier languages other than English.

Seattle defines its top tier languages based on the number of city residents who speak the language, broken into two tiers. The first tier includes languages spoken by at least 10,000 residents: Cantonese (written: Traditional Chinese), Korean, Mandarin (written: Simplified Chinese), Somali, Spanish, Tagalog, Vietnamese. The second-tier languages are spoken by at least 5,000 residents: Amharic, Cambodian/Khmer, Laotian, Oromo, Russian, Tigrinya, and Ukrainian.

[22] http://www.seattle.gov/rsji

Viet-Wah Supermarket employees and customers engage with an SPU outreach table (Source: SPU Image Library)

Seattle's Environmental Justice and Service Equity (EJSE) Team supports SPU and partner departments to carry out the RSJI and deliver inclusive and equitable services to customers across the city.[23] Environmental justice and service equity are the foundations of SPU's goal to be a community-centered utility. RSJI policies, such as the use of the Racial Equity Toolkit, help SPU identify and overcome service equity gaps when planning a project, program, or policy.[24] Table 1.1 on page 1.23 shows the six steps in the Racial Equity Toolkit to guide the development, implementation, and evaluation of policies, initiatives, programs, and budget issues to address the impacts on racial equity. To ensure thoughtful consideration of racial equity throughout the comprehensive planning process, the team working on the *2022 Plan Update* partnered with EJSE staff to:

- Conduct a Racial Equity Toolkit in the early development of the *2022 Plan Update,* so that a racial equity vision was created and outcomes from this vision were identified and embedded into all phases of the planning process
- Apply the Racial Equity Toolkit as a guiding framework for stakeholder engagement, including which audiences were engaged, what strategies and tactics were employed, and how input was received and used

[23] https://www.seattle.gov/utilities/protecting-our-environment/community-programs/environmental-justice-and-service-equity
[24] https://www.seattle.gov/Documents/Departments/RSJI/Resources/Racial-Equity-Toolkit-Fillable-RSJI-August-2012.pdf

- Consider disproportionate impacts of systemic and institutional racism on people of color, low-income individuals, immigrants and refugees, and English language learners; impacts were considered throughout the planning process, including when considering risk and resiliency and developing new metrics to support SPU's waste management programs and processes for the future

Table 1.1 Racial Equity Toolkit Steps

THE RACIAL EQUITY ANALYSIS CONSISTS OF SIX STEPS
Step 1. Set outcomes. Leadership communicates key community outcomes for racial equity to guide analysis.
Step 2. Involve stakeholders and analyze data. Gather information from both community members and SPU staff on how the issue benefits or burdens the community, in terms of racial equity. What does data show about potential impacts?
Step 3. Determine benefit and/or burden. Analyze issue for impacts and alignment with racial equity outcomes.
Step 4. Advance opportunity or minimize harm. Develop strategies to create greater racial equity or minimize unintended consequences.
Step 5. Evaluate. Raise racial awareness. Be accountable. Track impacts on communities of color over time. Continue to communicate with and involve stakeholders. Document unresolved issues.
Step 6. Report back. Share information learned through analysis and any unresolved issues with Department Leadership and Change Team.

A key outcome of applying the Racial Equity Toolkit in the development of the *2022 Plan Update* was to develop an overarching recommendation to make racial equity a core tenet of solid waste planning in Seattle, which is described in the next section.

Recommendation

In support of Seattle's commitment to RSJI goals, SPU makes the following recommendation that applies to all areas of SPU's solid waste services for the *2022 Plan Update.*

Rec 01. Lead with race and incorporate racial justice in solid waste programs, education, and outreach in support of SPU's commitment to providing racially equitable, inclusive, and culturally competent services

To support SPU's commitment to RSJI, this strategy would **make racial equity central to the development of all SPU solid waste programs, education, and outreach**. SPU will incorporate this approach into activities like regular rate reviews, development of metrics, and other recommendations throughout the *2022 Plan Update*. To support this work, SPU should ensure the availability of adequate staff time and budget to:

- Use the Racial Equity Toolkit consistently in program development, implementation, and evaluation. As SPU staff move forward with work identified in the *2022 Plan Update*, they are expected to use the Racial Equity Toolkit. The Racial Equity Toolkit should be used as early as possible in a work planning and design process and should be completed by people with different racial perspectives.
- Work to engage communities of color at the start of program planning and development. Past approaches have engaged these communities primarily after implementation, adoption of new ordinances, or during the enforcement period. In support of implementing the *2022 Plan Update* with equity, SPU should consider community-designed approaches or community-driven "innovation labs."
- Expand SPU's capacity to work with and serve diverse communities (including diversity in age, ability, race, immigrant or refugee status, and economic status). Expansion may include expanding staff capacity for applying the Racial Equity Toolkit; increasing staff and consultant resources for transcreation and customer usability testing of materials; continuing research to understand key challenges and barriers to best reach intended audiences and select appropriate communication tools; and developing tailored customer messages and approaches that are inclusive of the communities SPU serves.
- Develop a Racial Equity Strategic Plan specific to the Solid Waste Utility.
- Expand data evaluation to understand who is designing, delivering, using, and benefiting from SPU's services and identify when disproportionate impacts on certain groups exist.

SPU recognizes that effective programs include communities during upfront planning, not just implementation. Opportunities to enhance and expand community reach, service, and engagement are discussed throughout the *2022 Plan Update* in the recommendations in the

chapters. Examples of SPU's current efforts to promote service equity across all SPU waste prevention activities include:

- Working with community partners to provide waste prevention education and technical assistance in 12 languages to businesses and residents
- Offering multilingual services under the Garden Hotline, which is managed by Tilth Alliance and provides resources to all residents on natural gardening practices that reduce toxic risks and reuse yard waste on site as mulch and compost[25]
- Training and supporting volunteers to teach waste prevention in their communities through the Master Composter / Sustainability Steward Volunteer Program[26]
- Continuing to transcreate printed educational materials for both residents and businesses to provide information in multiple languages and in a way that is culturally relevant to the audience[27]
- Posting in-language guides online to educate business owners and employees of safer alternatives to toxic pesticides, fertilizers, solvents, and cleaning supplies
- Providing funding to community organizations and businesses to increase equitable access to waste prevention opportunities and benefits
- Continuing to center food rescue innovations on equitable solutions that address access, cultural relevancy, health, income, and racial disparities

Spotlight on Risk and Resiliency

In addition to deliberately and intentionally applying the RSJI racial equity lens to solid waste planning, SPU is also incorporating the utility-wide **Risk and Resiliency Framework**. SPU's Risk and Resiliency Framework guides investments in infrastructure, operations, and people to enhance SPU's ability to mitigate, adapt, recover, and continue to deliver services in the face of disasters, changing conditions, and new opportunities. Risk is the effect of uncertainty on core services. Resilience is a system's ability to reduce negative impacts and recover more quickly from stresses and shocks, while adapting to new conditions and opportunities. Managing the solid waste system involves both risk reduction and improving adaptation and response capabilities.

The seven focus areas in Seattle's Risk and Resiliency Framework are climate change, disasters, infrastructure, economy, market forces, technology, and workforce (see Table 1.2). All seven

[25] https://gardenhotline.org/
[26] https://www.seattle.gov/utilities/protecting-our-environment/sustainability-tips/landscaping/for-residents/compost-and-soil/backyard-composting/master-composter-program
[27] Where translation simply changes words into another language, transcreation ensures the meaning is clear and relevant in another culture.

focus areas are relevant to SPU's solid waste management system. SPU owns transfer station infrastructure and relies on privately-owned collection, processing, transport, and disposal infrastructure and operations. Each of these can be affected by disasters, deficiencies in infrastructures, new technologies, workforce challenges, volatile recycling markets, and economic changes such as traffic congestion and population growth. Climate change may affect solid waste management infrastructure, and waste prevention is an important tool to reduce climate change.

Table 1.2 Risk and Resiliency Focus Areas

RISK/RESILIENCY AREA	EXAMPLE OF A VULNERABILITY OR OPPORTUNITY
Climate change	Drought, extreme downpours, sea level rise, wildfires, temperature rise, air quality degradation, climate migration
Disasters	Earthquake, cyberattack, power outage, terrorism, pandemic, flooding, wind and snowstorms, fire, volcanic eruption, dam failure
Infrastructure	Aging and substandard infrastructure/facilities, seismic and climate change upgrades, regulatory requirements, new capacity for growth, projects by others
Economy	Affordability, population growth and traffic congestion, loss of customers and revenues
Market forces	Recycling markets, ability to site facilities, availability of raw materials
Technology	Emerging and current technologies, integration, obsolescence, decentralized systems
Workforce	Retirement wave, staff retention/turnover, loss of institutional knowledge, skill availability and development, competition

Details of the top challenges and areas of risk and opportunity facing solid waste management in Seattle appear below. They are presented by major element of the solid waste system.

Interdependencies within SPU's solid waste system. SPU manages two transfer stations and two household hazardous waste facilities, but relies on private contractors for collection, processing of recycling and food and yard waste, and transport to landfills for disposal. As a result, SPU depends on these contractors' facilities and operations for uninterrupted and responsible management of the City's solid waste materials. For moving solid waste, SPU depends on the transportation network that includes roads, bridges, and railways impacted by aging infrastructure and congestion. SPU's internal staff manage programs and coordinate with a variety of partners, consultants, and customers.

All these interdependencies are vulnerable to a variety of disruptions that may be due to natural disasters or extreme weather as well as social or economic reasons. Resiliency in services requires coordination internally and with external contractors and customers. By tracking trends and planning for disruptions, SPU can work internally and with contractors to provide resilient solid waste services.

Contracted collection services. Waste collection is an essential service for Seattle residents and businesses and is performed by contractors. SPU identifies and manages potential disruptions to collection services to increase resiliency. Some risk and resiliency considerations for solid waste collection include:

- Collection services depend on the road network that is maintained and managed by Seattle and by others, such as the Washington State Department of Transportation. Earthquakes, snowstorms, flooding, high winds, and volcanic ash can impact the transportation system. Population and economic growth can lead to traffic congestion and increased transit times. While Seattle typically has a mild climate, collection services for residents were postponed multiple times in February 2019 due to unusually heavy snow and icy road conditions.
- Disruptions to energy supply systems can affect collection vehicles. For example, in October 2018, one of Seattle's contracted solid waste collectors (Waste Management, Inc.) could not operate its garbage and recycling collection routes in many of its service areas due to a rupture of the natural gas pipeline in British Columbia.
- The availability of drivers is affected by economic conditions. Economic booms could lead to a shortage of drivers due to competition from other jobs with higher wages and more attractive working conditions. Higher cost of living could also lead to drivers leaving the area to work where their salaries go further.

Transfer stations. Seattle's North and South Transfer Stations are the connection point between collection and distribution operations with impacts to surrounding communities. Due to the long hours of operation and complex flow of vehicles and materials, transfer stations are dependent on a well-trained workforce. Transfer stations also depend on energy, water, and information technology. The movement of solid waste to and from transfer stations depends on the road and rail systems, including State Highway 99, Interstate 5, Interstate 90, and rail lines to the north, south, and east. Earthquakes, fires, and floods can also affect transfer stations, as can the availability of a trained workforce. All these dependencies must be considered and managed to make transfer station operations more resilient.

Moderate risk waste collection and disposal facilities. SPU operates two moderate risk waste facilities on behalf of the Hazardous Waste Management Program in King County that depend

on roads, energy, water, IT systems, and a trained workforce.[28] These facilities can be impacted by earthquakes, fires, and floods, as well as the lack of a trained workforce. Planning for these facilities is included in the *2021 Hazardous Waste Management Plan* for King County.

Complex waste stream. SPU manages a complex and ever-changing waste stream, including materials whose environmental and health impacts are not fully understood. The quantity, composition, and generators of the waste stream change with new trends in production, consumption, population growth, and economic growth.

Changing materials. Manufacturers continue to produce and sell new materials and combinations of materials that Seattle's existing recycling system was not designed to sort or process. SPU continues to work with processors and use available data to respond to changes and adapt programs as needed. For example, as more compostable packaging enters the solid waste management system, SPU continues to work with its compost processors to monitor these materials and design upstream program changes as needed.

New technology. Existing and emerging technologies present opportunities to improve recycling services and recovery. Radio-frequency identification (RFID) chips in carts can be used to track collection of specific streams. In recycling, continued improvements in sensors and sorting technologies can increase efficiency and help manage contamination at processing facilities. New material processing methods are gaining traction, such as chemical recycling and secondary processing of recyclables that are not effectively sorted at primary material recovery facilities. SPU assesses emerging technologies for risks and benefits when evaluating processing options.

Customer sorting of waste. To maximize recycling and minimize contamination, SPU relies on residents, employees, and businesses to properly separate garbage, recyclables, and compost and to properly dispose of hazardous materials that do not belong in these waste streams. SPU works to mitigate the risks of relying on the actions of individuals to reduce garbage contamination of the recycling and maintain the high quality of recyclables and compost through several strategies, especially outreach, education, technical assistance, and enforcement.

Unprecedented events. The recent COVID-19 pandemic has challenged the resiliency of the solid waste system with, for example, reduced staff availability and the resultant temporary service reductions at transfer stations and Household Hazardous Waste drop off sites. Office functions have shifted to teleworking and face-to-face customer education efforts were paused or modified to accommodate safety protocols, like face coverings and social distancing.

[28] https://kingcountyhazwastewa.gov/

However, the solid waste system has adjusted to continue providing essential solid waste services, and many staff have learned to operate more flexibly under unusual circumstances.

While SPU cannot predict the future, by taking a long-term view and planning for a variety of possible future scenarios proactively, SPU can make strategic investments that reduce risk and increase resilience.

Participants and Responsibilities

In developing this *2022 Plan Update*, SPU followed state guidelines and requirements, including engaging several different parties, or stakeholders, from government, the community, and the private sector. This section describes each of these group's roles in collaborating with SPU on the *2022 Plan Update*.

Government

- **SPU** is responsible for creating, executing, and funding all City of Seattle solid waste programs and projects. SPU is also responsible for developing and maintaining the *2022 Plan Update*, as described below.
- **Office of the Mayor** sets direction for all City departments, including SPU.
- **Seattle City Council** is the City's legislative body and adopts the *2022 Plan Update* by resolution.
- **Ecology** reviews and approves the *2022 Plan Update*. As described further below, Ecology also confers with SPU regarding future updates to maintain the plan.
- **Partner agencies**, such as King County's Solid Waste Division, Public Health–Seattle and King County (PHSKC), and the Hazardous Waste Management Program in King County, provided input on solid waste industry trends, issues, and proposed solutions.

Community and Private Sector

- **SPU's Seattle Solid Waste Advisory Committee (SWAC)** is an advisory body mandated by state law to provide recommendations and informed advice to the Solid Waste Utility regarding solid waste management issues. The SWAC provided policy advice and was involved throughout the planning process. Appendix H, *Seattle Solid Waste Advisory Committee (SWAC) Participation in Planning,* documents their involvement. SWAC will continue to be involved in future implementation of the *2022 Plan Update*.
- **Community Connections** is a program of SPU that funds multi-year partnerships with trusted organizations that serve a variety of ethnic and language groups to gather community input and to adapt and deliver in-language presentations and activities. Community Connections partners provided input and recommendations for how customers

who are people of color, low-income, immigrants, and refugees participate in the decision-making and policy development process to improve service delivery, provide for culturally relevant education and outreach programs, and provide input to future development of waste prevention activities and product stewardship legislation.

- **Industry stakeholders**, such as collectors, processors, and waste and environmental interest groups, provided input on solid waste industry trends, issues, and proposed solutions.
- **General public** includes residents and businesses, solid waste industry representatives, and interest groups. The public's role was played out via the *2022 Plan Update's* public involvement process, with support from Community Connections Partners. Appendix D, *Stakeholder Engagement Summary,* describes the public involvement process.

Each of these parties has their own perspective on the *2022 Plan Update*, which is meant to serve as a resource to all of them. For example, regulators are interested in ensuring the *2022 Plan Update* meets legal requirements; SPU will use the *2022 Plan Update* to guide solid waste work in the coming years; and the public is interested in their critical role in achieving the goals identified in this *2022 Plan Update*. SPU offered opportunities for community and private sector stakeholders to provide input that informed recommendations included in the *2022 Plan Update*.

Recommendations Development

With input from its stakeholders, SPU developed recommendations in the *2022 Plan Update* through a process that gathered ideas for different alternatives from SPU staff and evaluated them against Seattle's overarching solid waste management goal areas, such as risk and resiliency, described in Goal Areas for Solid Waste Management, above. In developing the alternatives, SPU considered options for new programs and policies as well as opportunities to expand or enhance current programs.

To evaluate the alternatives, SPU took a slightly different approach than in past plans. In past plans, SPU modeled many different scenarios and selected the most cost-effective scenario that produced the largest recycling rate. The process for recommending programs in the *2022 Plan Update* was instead based on an innovative multicriteria decision analysis that considered both social and environmental impacts of the recommended actions.

For this plan, SPU evaluated and ranked programs based on the seven goal areas of the *2022 Plan Update* to decide which programs should be implemented. For example, environmental impacts were included by considering the solid waste management hierarchy—where a recommended action that addressed waste prevention was considered "very positive," one

that addressed recycling was considered "positive," and recommended actions that did not affect any materials were considered "neutral."

For a subset of alternatives, SPU also estimated quantitative impacts by modeling the alternatives in SPU's **Recycling Potential Assessment (RPA) model**. The RPA model estimates potential impacts of alternatives on tons generated and diverted and financial costs and savings. SPU also uses a separate model to estimate the environmental benefits from diverting more tons. Appendix E, *Recycling Potential Assessment Model and Environmental Benefits Analysis,* presents the methodology and results of the RPA and environmental benefits model, including the projected recycling rates based on the programs recommended in the *2022 Plan Update*. Recycling rate projections were included to provide continuity with past solid waste plans in which the recommendations were driven primarily by their impact on the recycling rate.

Social and Environmental Impacts of Recommendations

In addition to recycling rate projections, the recommendations in the *2022 Plan Update* are expected to produce other improvements, such as more equitable, affordable, resilient, and safe services. By emphasizing waste prevention, SPU will help reduce greenhouse gas emissions associated with goods consumed in Seattle and will be responsive to the leadership and interest that diverse Seattle communities have demonstrated.

After reviewing the qualitative and quantitative evaluations, SPU staff prioritized the alternatives into the following categories:

- Already budgeted for as of 2021 and/or already in progress
- Short-term priority (1-5 years)
- Long-term priority (6-20 years)
- Not a current priority for the Solid Waste Utility

SPU has included recommendations for programs and policies in each chapter according to relevant topical area. Throughout each chapter, the *2022 Plan Update* recommends many new or expanded strategies for reducing waste, increasing recycling, and managing the solid waste system. Full explanations of recommendations are contained in the relevant chapters.

Metrics and Targets

Seattle is a data-driven city. Over the last three decades, SPU has built one of the most extensive solid waste datasets in the United States. SPU analyzes these datasets to understand key metrics that indicate the performance of current solid waste facilities and services and to set data-driven targets for goals. SPU creates metrics and targets at two levels: 1) at the citywide level to track big-picture, system-wide goals around waste generation, recycling, and environmental impacts, and 2) at the service- or facility-level to measure the performance of individual activities, services, or facilities. Recommendations in the *2022 Plan* address developing new metrics and targets at both levels.

Measuring Upstream Goals and Environmental Impacts

Developing tools and methodologies to accurately capture the change in focus and priorities further upstream described in this chapter will require innovative and groundbreaking work in the next two to three years. SPU will need to develop new performance metrics and targets to establish current baselines and track progress. A specific challenge will be to track how SPU makes progress in waste prevention, as it is difficult to measure waste that was not produced, and to measure environmental impacts of specific strategies.

To advance in our ability to measure the impacts of upstream strategies, the *2022 Plan* explores potential metrics and targets that are better aligned with an emphasis on waste prevention and reducing the environmental impacts of waste than the recycling rate is. Based on preliminary work by SPU and other leading municipalities, the *2022 Plan* outlines a list of potential new overarching waste reduction and waste prevention metrics, as well as some targets, to consider in Chapter 2, *Maximizing and Measuring Impact: Moving Upstream Beyond the Recycling Rate*.

Measuring Services and Activities

Additionally, the *2022 Plan Update* includes near-term recommendations for SPU to explore and expand the evaluation and measurement of its programs across all stages of the materials management life cycle. New metrics are needed to track activity and performance in priority areas for SPU such as equity, operational excellence, safety, and broader environmental impacts that are not adequately reflected in current measurements like the recycling rate. Key measurement areas include:

- **Waste prevention**: explore ways to capture attitudes and actions around this topic, quantify actions related to circular economy and resource sharing, and assess the potential to reduce the generation of specific materials

- **Collection and processing**: research, evaluate, and identify new performance metrics that also consider climate impacts of operations
- **Behavior change programs**: use available data to develop more strategic approaches and identify high-priority areas with the greatest potential for waste prevention and diversion
- **Overarching:** consider equity impacts of solid waste management activities and continually assess how access to services and the risks and benefits associated with SPU's activities are distributed throughout the community at large

More research and evaluation are needed to identify what best balances SPU's needs, costs of the measurement activities, and alignment to overall goals. As a result, the *2022 Plan Update* does not recommend specific new metrics for goal areas such as environmental impact and equity. However, the *2022 Plan Update* documents areas that SPU can consider exploring in the future to assess progress against goals. In the next chapter, *Maximizing and Measuring Impact: Moving Upstream Beyond the Recycling Rate*, SPU provides background of Seattle's evolving solid waste goals and approaches, and how they have informed the development of new metrics and targets.