MEMO

Date: September 3, 2024
To: Tumwater City Council
From: City of Tumwater Green Team

2023 Green Team Sustainability Report

Purpose

This report evaluates the City's current practices related to climate, water, energy, transportation, and solid waste. This is the fourth consecutive Green Team Sustainability Report for the City of Tumwater. The baseline year of 2019 is used for all but two metrics (waste and greenhouse gas emissions). The greenhouse gas (GHG) baseline year of 2015 was established via Resolution by the City Council and reported as such. A solid waste baseline had not been available in prior years and thus 2021 is established as the baseline year. This report compares 2023 data to each metric's established baseline year, goal, and past data wherever data was available.

Climate

Greenhouse Gas Emissions of City operations

Green Team goal: reduce net emissions 45% by 2030 and 85% by 2050 (2015 baseline).

The City measures GHG emissions in two ways: total emissions and net emissions. Net emissions are the total emissions minus offsets or renewable energy credits. Resolution No. R2018-015, passed by City Council on June 19, 2018, adopts community-wide net GHG reduction targets of 45% below 2015 levels by 2030 and 85% below 2015 levels by 2050. The Green Team adopted these community-wide targets to also be applied on a smaller scale to City operations. These reduction targets are for net emissions, per page 21 of the Thurston Climate Mitigation Plan.

Total Emissions

In 2023, City operations produced an estimated total annual emissions of 3,821 metric tons of CO_{2e}. Total emissions in 2023 are less than 1% below the 2015 baseline. Emissions from the City's water and sewer infrastructure increased by about 10% due to increased production of water, the City vehicle

fleet emissions increased by 6% due to increased fuel consumption, and emissions related to natural gas heating[1] of City buildings increased by about 2%. When expressed in terms of MTCO2e/City resident, the 2023 City operations carbon footprint was about 29% lower than the 2015 per resident carbon footprint.

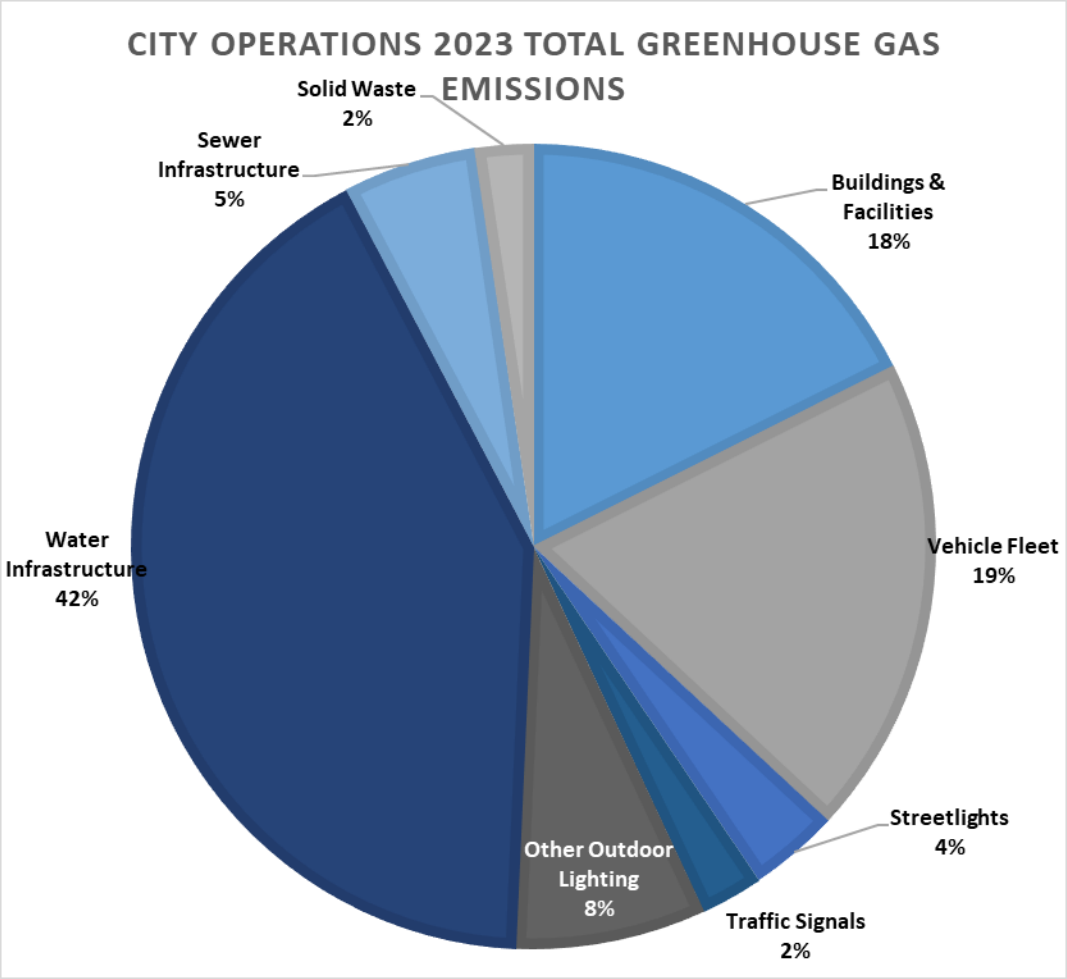

Figure 1. Sources of City total GHG emissions in 2023.

Net Emissions

The City of Tumwater takes part in Puget Sound Energy's Green Direct program and received certificates for 6,286,000 kWh generated at the Skookumchuck Wind Farm and Lund Hill Solar Farm during the 2023 calendar year. Because of this, the net emissions of City operations in 2023 are estimated to be 1,033 metric tons of $CO_{2e,}$ 73% below the 2015 baseline emissions surpassing our City

[1] 2023 was a colder year than 2015 (baseline year) with 17% more heating degree days.

operations 2030 GHG reduction goal. Note, however, that community-wide emissions are not on track to meet targets and will require continued effort.

The remaining net GHG emissions of City Operations are made up 71% of the city vehicle fleet, 20% natural gas consumption, and 9% waste, as shown in Figure 2.

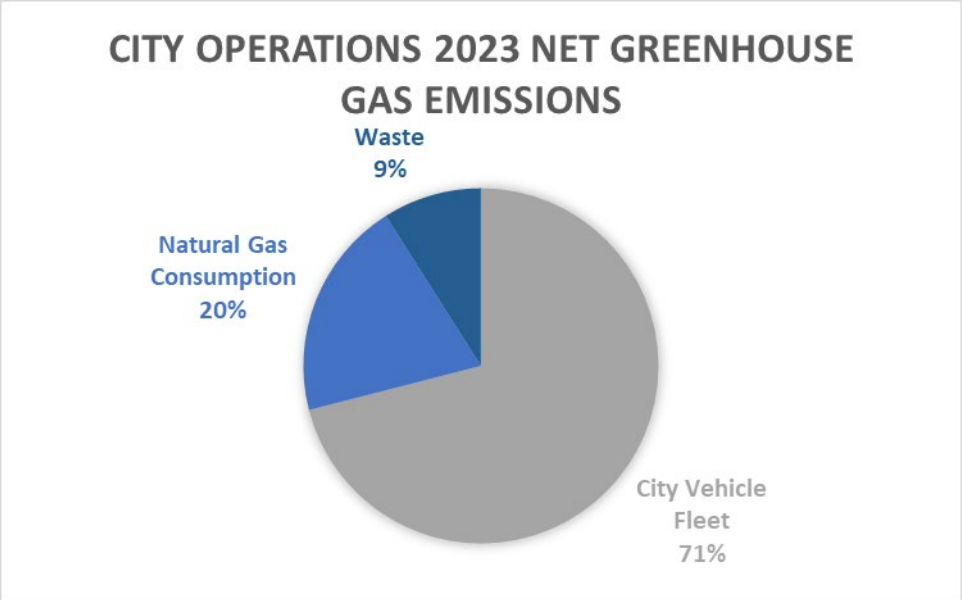

Figure 2. Sources of City net GHG emissions in 2023.

Thurston Climate Mitigation Plan implementation

In 2021 the City Council accepted the Thurston Climate Mitigation Plan (TCMP). The TCMP includes seventy-two actions the City and regional partners can take to achieve the regionally accepted greenhouse gas reduction targets of 45% reduction by 2030 and 85% reduction by 2050 (compared to 2015 baseline).

The Thurston Climate Mitigation Collaborative produced the 2023 Annual Report on Regional Implementation which details which actions the City of Tumwater has taken to date. A selection of those implementation actions by the City of Tumwater taken in 2023 include:

- Attained SolSmart Silver accreditation from the U.S. Department of Energy;
- Kicked off Solar and Battery Storage Feasibility Assessments at City Hall and the Tumwater Timberland Library;
- Completed a Fleet Electrification Assessment;
- Installed 3 publicly accessible EV (Electric Vehicle) chargers at City Hall; and
- Completed an Investment Grade Audit of City Facilities;

City Fleet

Green Team goal: not yet established.

After our emissions from electricity consumption, the City's vehicle fleet is the largest contributor to total greenhouse gas emissions from City operations. When looking just at net emissions of City operations, our City fleet fuel consumption makes up 71% of emissions. In 2023, vehicles used 63,818 gallons of gasoline, 16,968 gallons of diesel, and 1,175 gallons of renewable diesel. Figures 3 and 4 show the percentage of fuel consumed by each department. Between the 2019 baseline and 2023, there was virtually no change in fuel consumption (gasoline, diesel, and renewable diesel combined). However, in 2023 the City started testing renewable diesel in its street sweeper, which replaced more than 1,000 gallons of fossil diesel.

In 2023, the City Green Team utilized The Electrification Coalition's DRVE (Dashboard for Rapid Vehicle Electrification) tool to conduct and circulate a Fleet Electrification Assessment. The Fleet Electrification Assessment created a time-bound plan to electrify as much of the City vehicle fleet as feasible, created an associated fuel consumption reduction target and timeline, and developed a time-based plan to meet future EV charging infrastructure needs. In 2023, this Assessment was used to secure $87,000 in Department of Commerce grant funding to help pay for the installation of EV chargers needed over the next 2-3 years.

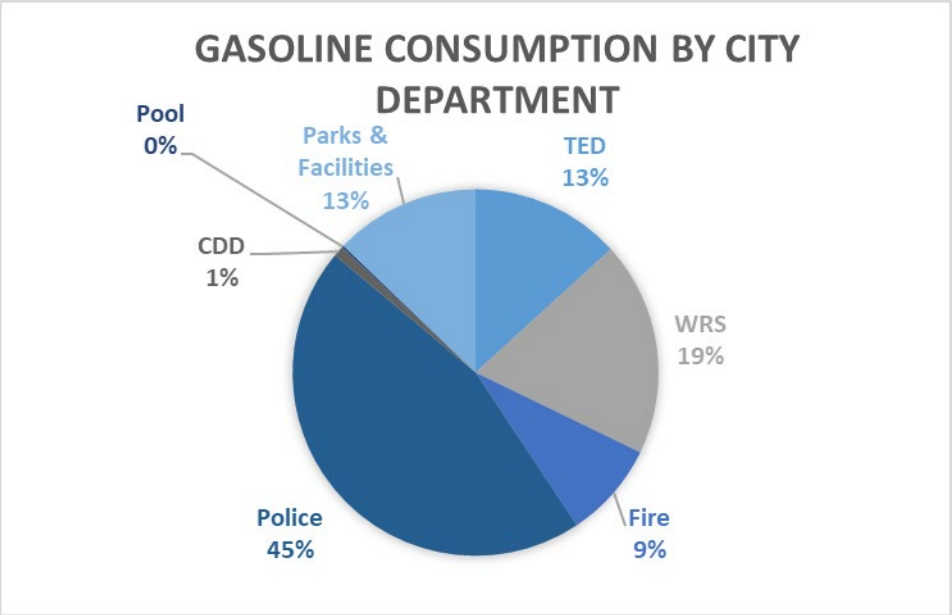

Figure 3. Gasoline consumption by City departments in 2023.

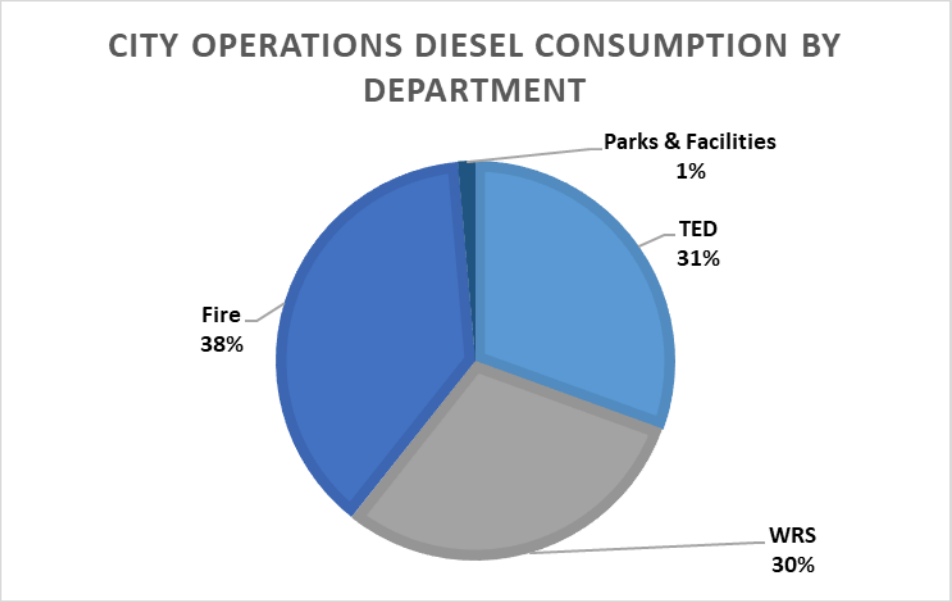

Figure 4. Diesel consumption by City departments in 2023.

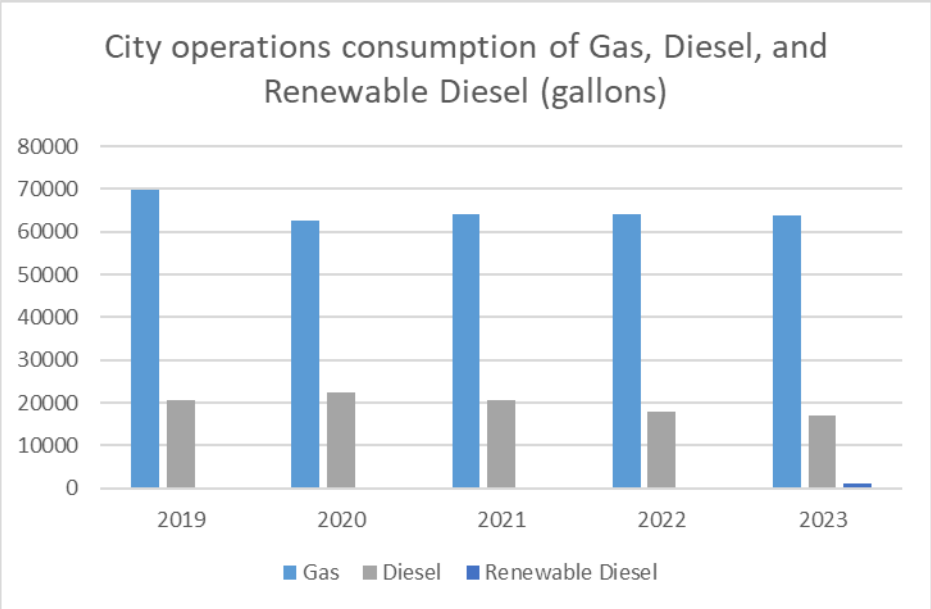

Figure 5. City operations consumption of gas & diesel since 2019.

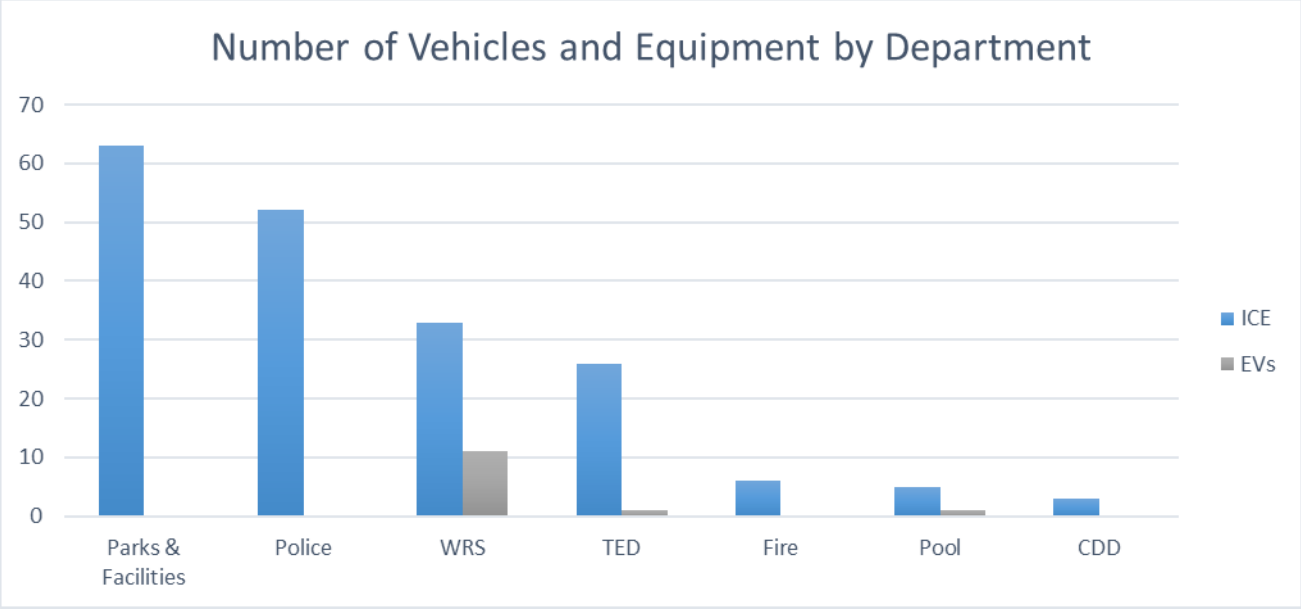

Figure 6. Number of vehicles and equipment by Department.

The City has taken steps to increase the number of electric vehicles in the fleet and functions under an "EV or Hybrid First" purchase method for replacement and new vehicles. By the end of 2023, the City currently has thirteen (13) battery-electric vehicles, sixteen (16) hybrids (both plug-in and non-plug-in hybrids), 148 gasoline-powered vehicles, and thirty-two diesel-powered vehicles in use. Of the 13 battery-electric vehicles and 16 hybrids in our fleet, 8 were new cars added to the fleet and 21 replaced internal combustion or older hybrid vehicles.

In 2023, the City had eight (8) Level 2 Electric Vehicle Charge ports to support the fleet Electric and Plug-In Hybrid vehicles. All energy used to charge the City Electric and Plug-In Hybrids is enrolled in PSE's Green Direct Program. In 2023 the City used 2,463 kWh to charge the electrified fleet vehicles, which in turn avoided the combustion of 521 gallons of fuel and an estimated 9.5 metric tons of carbon dioxide equivalent emissions.

Vehicle Type	2019 Baseline	2023
% of electric vehicles	1%	7%
% of hybrid vehicles	5%	9%
% of internal combustion engine vehicles	94%	84%

Table 1. Percentage of vehicle types 2019 baseline compared to 2023.

Additionally, the City installed three Level 2 Electric Vehicle chargers at City Hall for public and workplace use in 2023. Between April 2023, when they were installed, and December 2023 the public charging sessions supported 381 charging sessions at an average cost of $1.34 per charge session.

Buildings

During 2023, the City underwent an Investment Grade Audit (IGA) of its facilities. The Department of Enterprise Services and consultant MacDonald-Miller Facilities Solutions, Inc completed this work. The Investment Grade Audit found facility improvements that, if implemented, could reduce GHG emissions of City buildings by 114.8 metric tons of carbon dioxide equivalent per year (~3% reduction in emissions from the baseline). The estimated cost of these improvements is $4.5 million. Identified potential improvements include but are not limited to (in order of carbon emission reductions possible):

IGA Identified Improvement	Estimated Total Construction Cost
Replacing City Hall and Police HVAC (Heating, Ventilation, and Air Conditioning) system with efficient electric heat pump system	$1,738,472
Replacing Public Works Building #2 heating with a mix of heat pumps and tube heating	$896,457
Replacing Public Works Building #3 heating	$230,881
Reconnecting the River's Edge kitchen outdoor air reheat	$58,745
LED lighting upgrades for buildings that haven't been upgraded yet	$682,797
Replacing hot water heaters with heat pump hot water heaters	$63,579
Upgrading City parks irrigation controls	$448,878

Given the estimated $4.5 million in total unbudgeted costs (including items not included in the table above), Staff opted to pay for the IGA outright and schedule improvements as the City budget allowed in the coming years.

Natural Gas

Green Team goal: not yet established

Natural gas is a fossil fuel that emits greenhouse gases including methane during its combustion and production. In 2023, the City consumed 43,730 therms of natural gas. When looking just at net emissions of City operations, natural gas consumption makes up 20% of emissions. Most of the natural gas was used at the Golf Course, City Hall, and Fire Stations (Figure 7). This was the first year that Puget

Sound Energy provided natural gas consumption data for the Golf Course as part of the Green Team Report data request. When comparing apples to apples (without Golf Course data included), between the 2019 baseline year and 2023 there was a 4.95% increase in natural gas consumption. Natural gas consumption varies year to year across different buildings likely due to occupant comfort concerns. However, the Golf Course consumes a significant amount of natural gas which has grown in the past year. Between 2022 and 2023, natural gas consumption at the Golf Course (used by Rivers Edge) increased by 267.68% at an additional cost to the City of $11,346. Staff have observed that kitchen staff running the gas stoves to heat the kitchen space due to an outdoor air reheat being disconnected in a past facility efficiency effort, which is likely the reason for the increase. Note that Rivers Edge's gas bill is currently included in their lease agreement with the City.

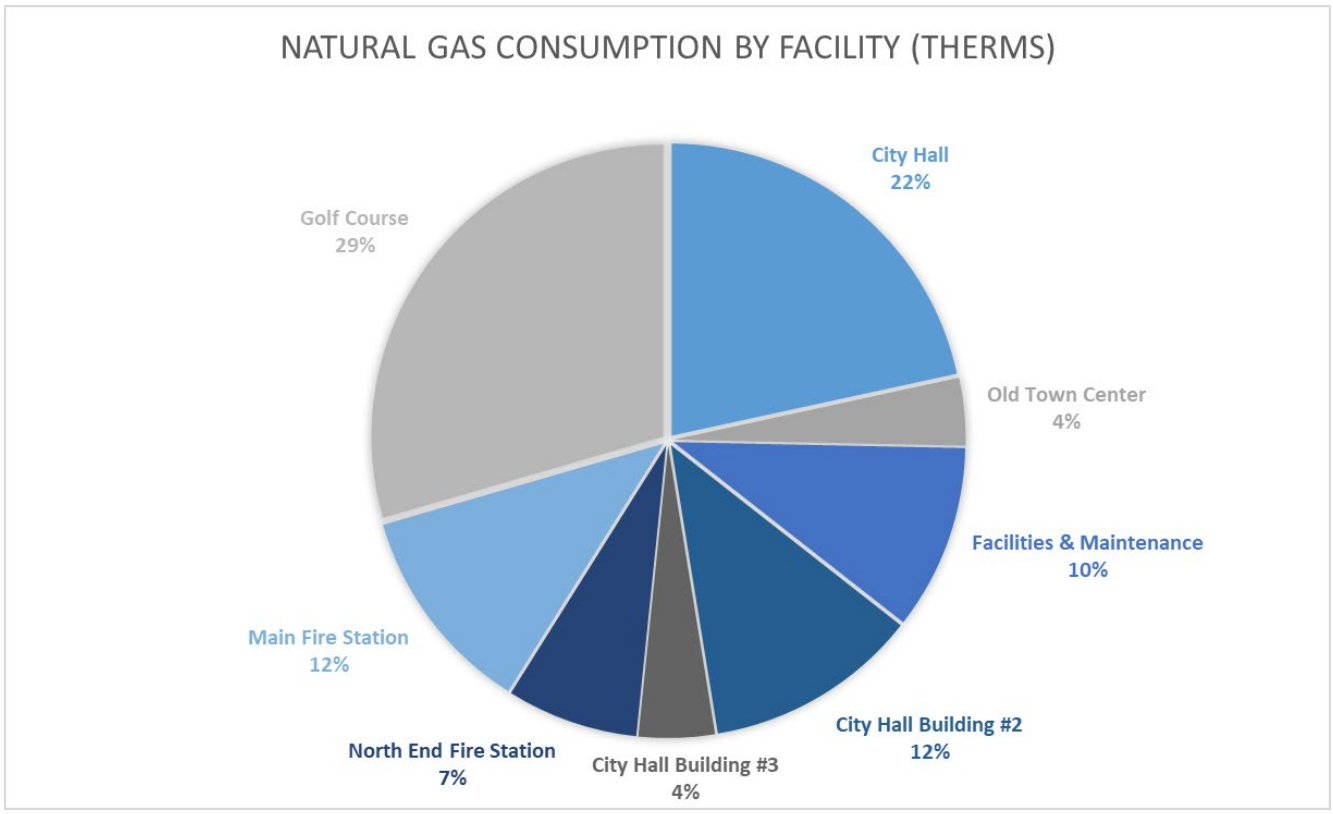

Figure 7. Natural gas consumption by facility in 2023

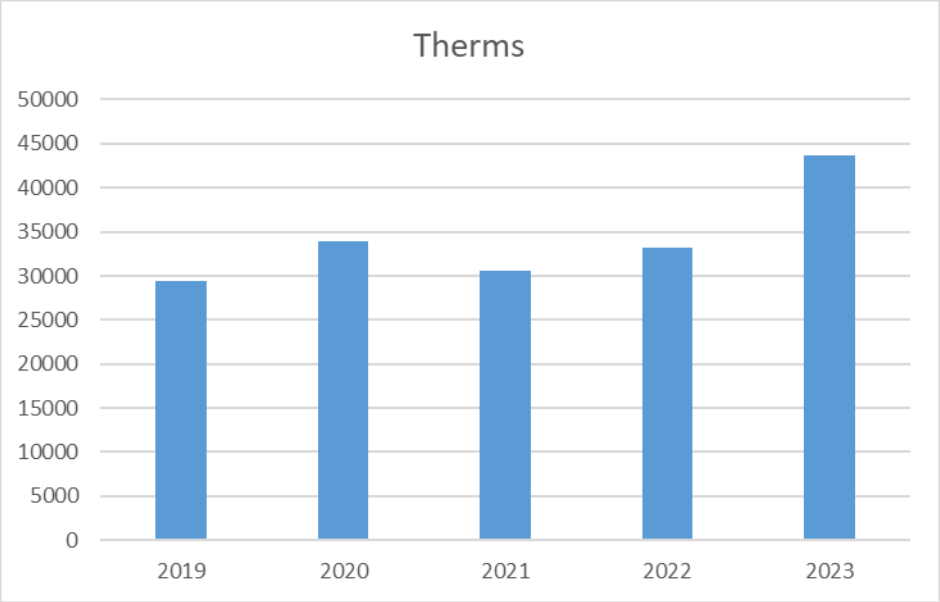

Figure 8. City operations natural gas consumption (therms).

Tumwater City Council has adopted a Strategic Priority for new City buildings to be all-electric, but there is no established time-based target to reduce City operations natural gas consumption in existing buildings currently. Establishing such a goal is on the Green Team's 2024 Work Plan.

Electricity

Green Team goal: reduce electricity consumption 2% each year or 20% by 2030 (2019 baseline)

City buildings/facilities used 6,285,642 kWh of electricity in 2023, which equates to a 16.4% increase from the 2019 baseline. Electricity increases were associated with the largest users of electricity: water & wastewater infrastructure, buildings and facilities, and streetlights and signals.

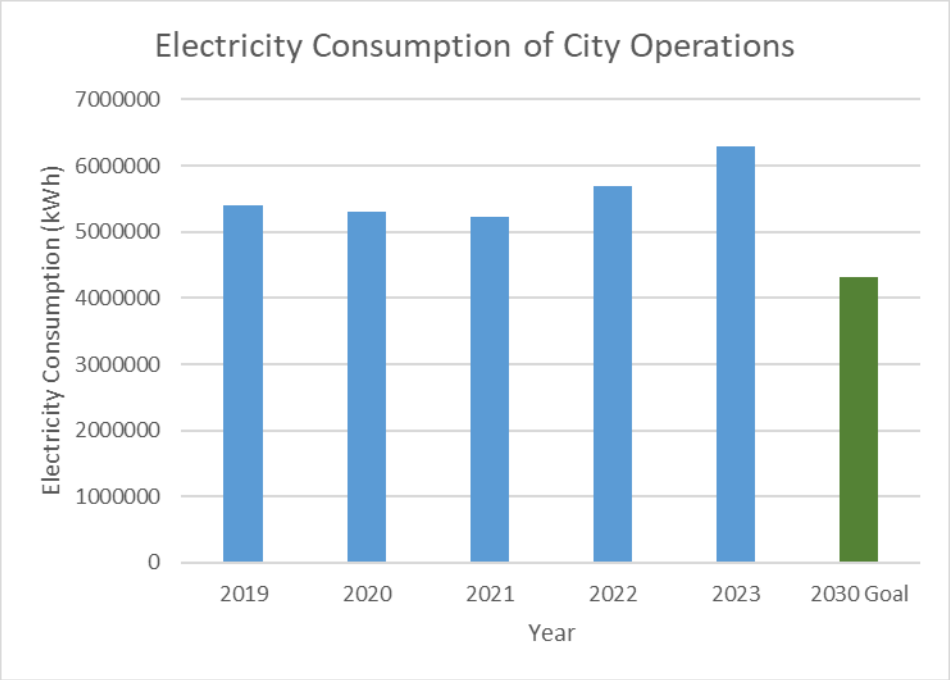

Figure 9. Electricity consumption of City operations and goal.

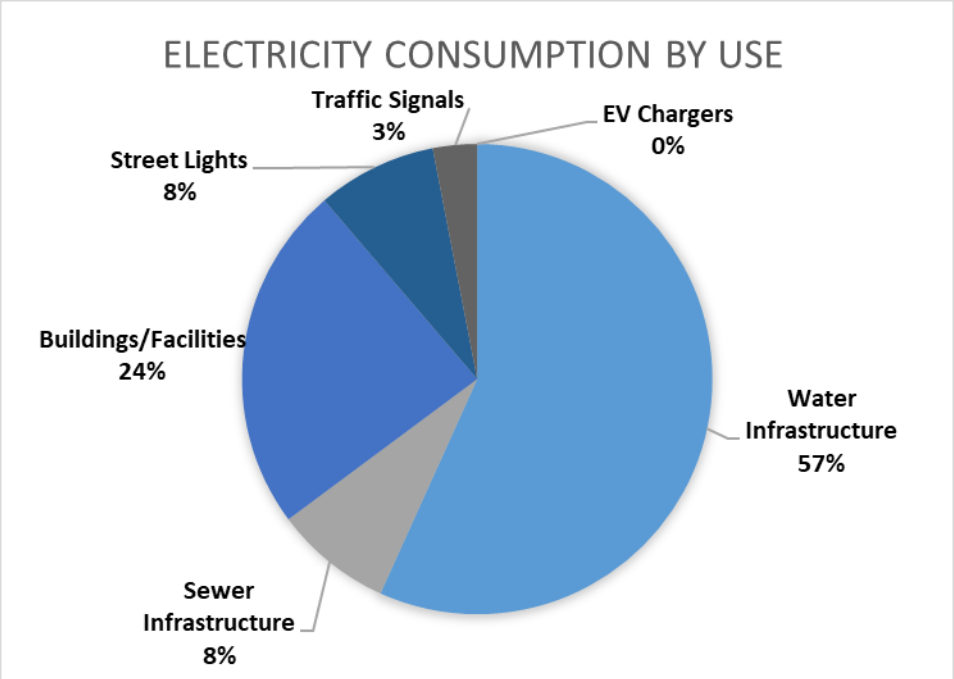

Figure 10. City operations electricity consumption by use.

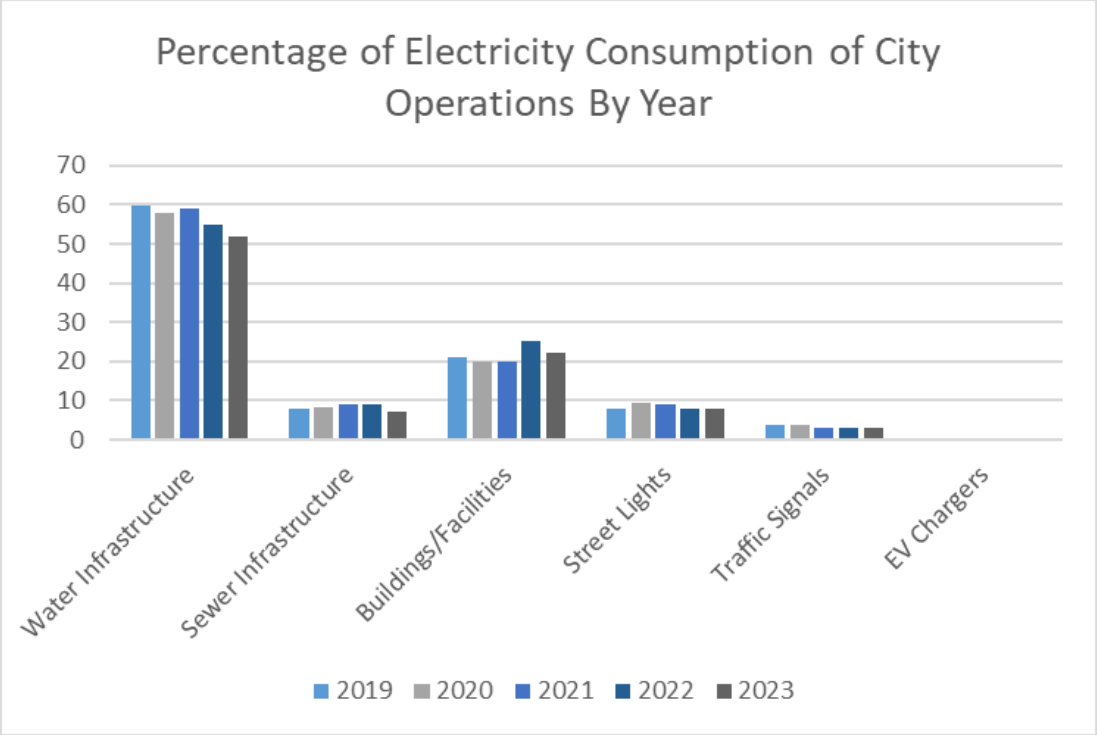

Figure 11. Percentage of electricity consumption of City operations by year.

In 2024 the Green Team discussed reconfiguring the electricity goal to be better reflective of efficiency improvements in facilities regardless of a growing staff and water customers. The Green Team is currently in the process of developing these goals, which will likely be created in alignment with Washington Clean Building Performance Standards.

Renewable Energy

Green Team goal: increase the production of renewable energy.

In 2023, the solar panels at City Hall produced 25,342 kWh of energy. This accounts for 7% of City Hall's 2023 electricity consumption. The solar arrays installed at water utility sites, such as Crites stormwater pond, also produced 3,652 kWh of energy.

In November 2020, the City Wind Project via Puget Sound Energy's (PSE) Green Power Program. In 2023 City operations received Renewable Energy Certificates for 100% of City operations electricity consumption. These Renewable Energy Certificates are responsible for the decrease in net emissions.

Continuing commitment to renewable energy and other greenhouse gas reducing actions/measures is key to the City

Figure 12. Solar array at Crites Road water fill station

Employee Commute

Green Team goal: 30% of employees participating in CTR by 2030

The City partners with Thurston Regional Planning Council to run the Commute Trip Reduction (CTR) program, aimed at incentivizing employees to reduce the number of trips made to and from work each week in single-occupancy vehicles. The CTR program was paused during the COVID-19 pandemic. In 2022 the City Green Team refreshed the City CTR policy and re-launched the program for staff. Major changes included:

- Removing telework as an incentivized action as it has become a widespread practice.
- Adding walking, biking, and taking the bus as incentivized CTR methods.
- Created an incentive for employees to purchase/lease new/used electric and plug-in hybrid vehicles.

In 2023, three (3) employees utilized the CTR incentive to purchase new electric vehicles to use for commuting to work. Additionally, 6 employees signed up to participate in the CTR program. This accounts for 4% of employees, far below the Green Team goal of 30% of employees participating by 2030.

Indoor and Outdoor Water Consumption

Green Team goal: reduce potable water consumption for city activities 3% per year (2019 baseline).

In 2023, the City used 28.8 million gallons of water for both indoor/outdoor water use, a 15.25% increase from the baseline year. This large increase is mostly due to Tumwater Falls and Brewery Park not being included in the initial baseline but included as a City facility in 2023 (the City pays the water bill of the Park). Out of the 28.8 million gallons used by the City in 2023, 15% was used inside City facilities, while the vast majority was used for irrigation in parks, medians, and right of way.

In 2023, the City used 31.9 million gallons of potable water to irrigate parks, right of ways/medians, and building landscaping. Of the total amount of water used, 42% was used by Parks, while 26% was used to irrigate right of way, and 17% was used for Building landscaping as seen in Figure 13.

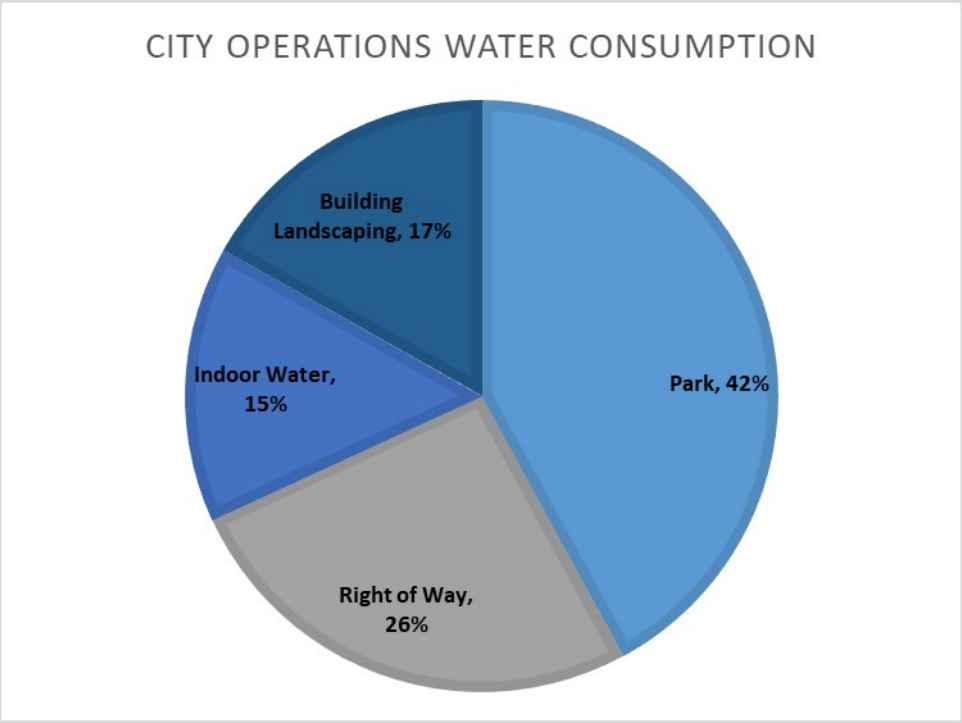

Figure 13. City operations water consumption.

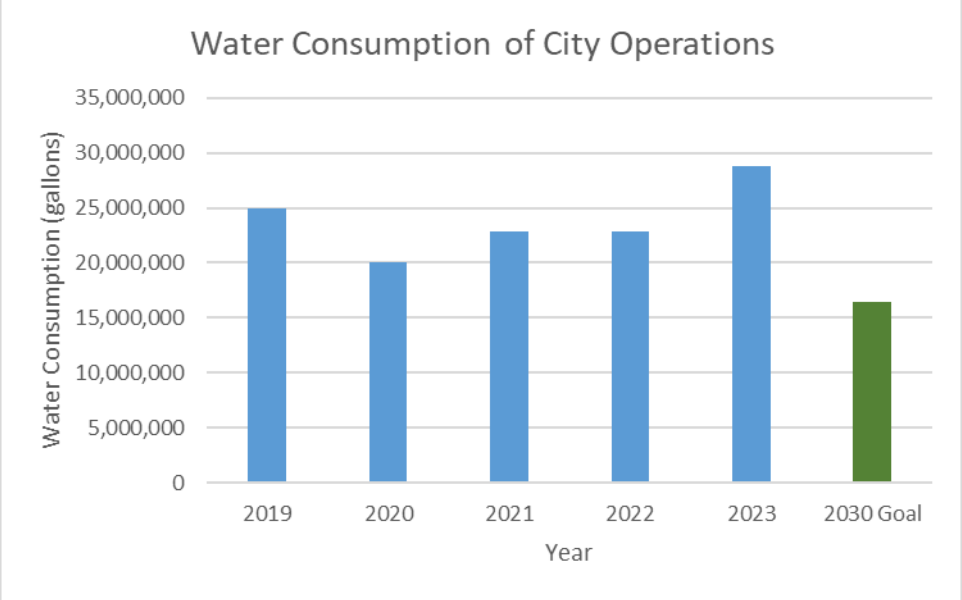

Figure 14. City operations water consumption & goal.

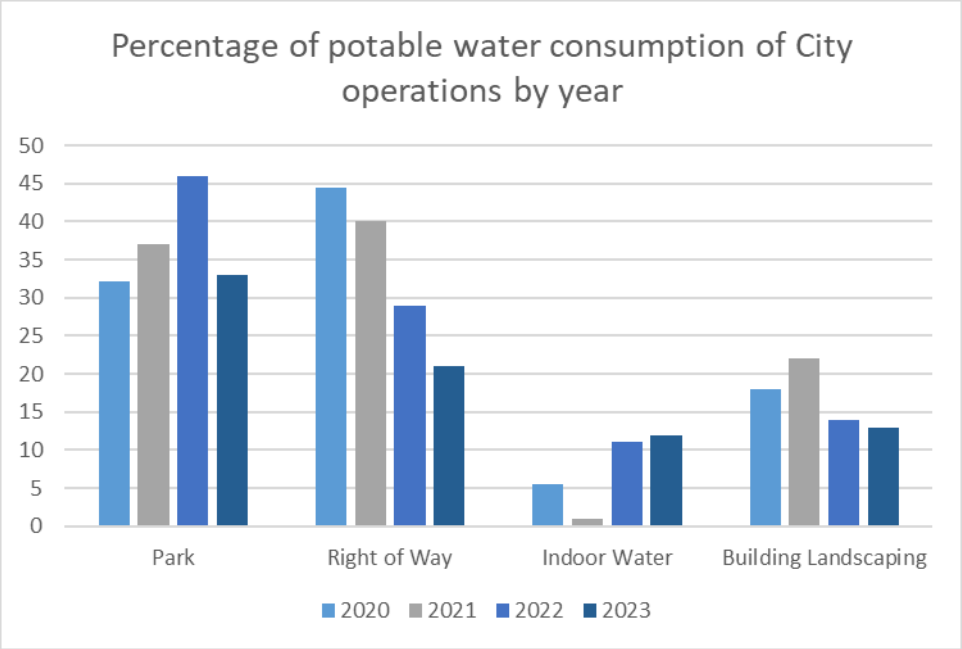

Figure 15. Percentage of potable water consumption of City operations by year

The Green Team is currently in the process of developing a more specific irrigation and domestic water conservation goals for City properties.

Reclaimed Water

In 2023, the City used 55,500,000 gallons of reclaimed water at the golf course. The use of reclaimed water is a best management practice for water use management at golf courses and is a great use of water that has been used once, cleaned to a high level, and can then be used again preserving potable supplies for consumer domestic use.

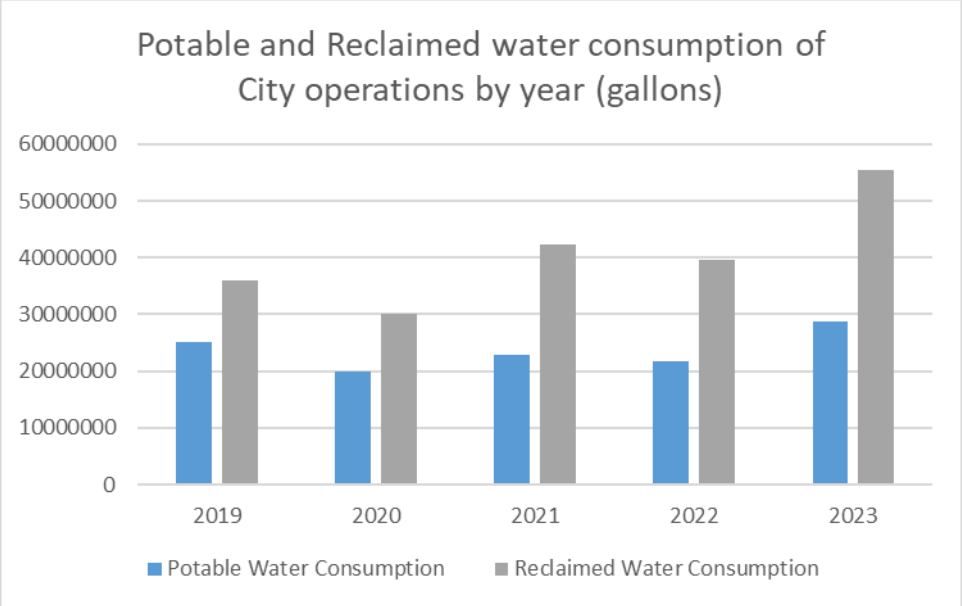

Figure 16. Total domestic and irrigation potable vs reclaimed water consumption of City operations by year (gallons).

Solid Waste

Green Team goal: reduce solid waste (garbage) 10% by 2030 (2022 baseline)

In 2023 City operations produced an estimated 331,185 pounds of solid waste (Figure 17). This value does not include solid waste produced at Parks nor Street Sweeping waste. We are currently recycling or composting 25% of City operations solid waste by weight (Figure 18).

LeMay/Pacific Disposal has provided this estimated amount of waste by type for the calendar year based on container sizes and frequency as pickup for 2021, 2022, and 2023. While we appear to have reached our goal in waste reduction in 2023, the method of estimating waste is imperfect. For instance, in 2023, the City launched a compost diversion effort in City facilities which has been successful. However, we did not change the size or frequency of the trash containers at the locations where compost is being diverted. These estimates do not capture changes that do not require shrinking container sizes. The Green Team is discussing alternative methods of waste estimation in 2024, including potentially adding sensors to dumpsters.

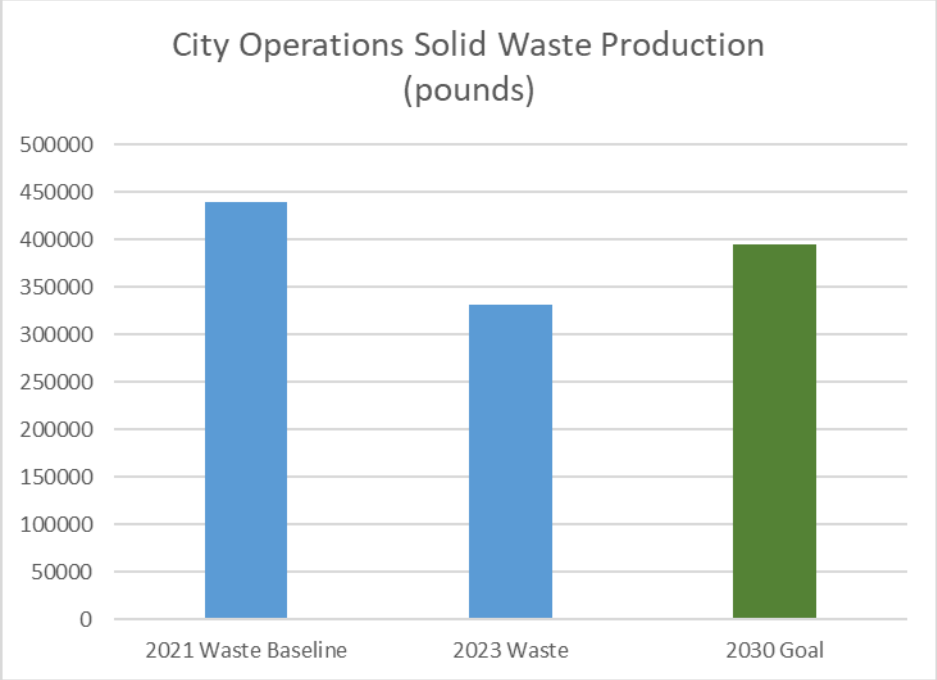

Figure 17. City operations solid waste production.

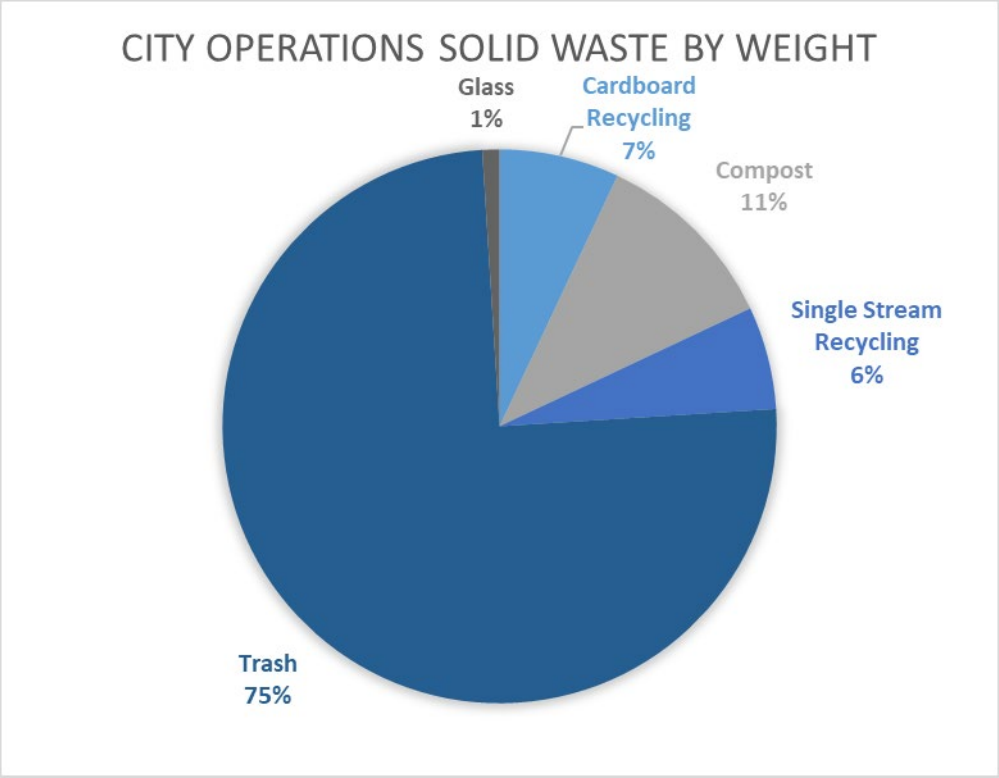

Figure 18. Solid waste by type produced by city operations in 2023.

Progress towards goals

1. Reduce greenhouse gas emissions produced by City activities 45% below 2015 levels by 2030: approximately 3% per year. In 2015 the City produced 3,793 metric tons of CO_2e.
    a. 2015-2022: Less than 1% decrease in total annual emissions from baseline.
    b. 2015-2022: 73% decrease in net annual emissions from baseline.

2. Increase the percentage of renewable energy being used by City activities and reduce electricity usage 2% per year; or 20% by 2030 from 2019 levels.
    a. 100% of electricity consumption was offset with Renewable Energy Certificates provided by PSE Green Direct Program.
    b. 2019-2022: 16.4% increase in electricity usage from baseline.

3. Increase employee alternative transportation participation during their commutes to work by 30% by 2030.
    a. 3% of employees participated in the Commute Trip Reduction Program.

4. Reduce water use 3% per year from City activities from 2019 levels.
    a. 2019-2022: 15.25% increase in potable water use.

5. Reduce solid waste (garbage) produced by City activities by 10% by 2030.
    a. 2021-2022: 25.4% decrease in solid waste produced by City Activities.
    b. In 2023, an estimated 25% of all solid waste by weight was diverted to recycling and composting.

Recommended Next Steps

The following recommendations are intended to help the City continue to make progress on its goals:

- Fund and carry out electrification and efficiency improvements as recommended by the Investment Grade Audit completed in 2024;
- Continue to replace internal combustion engine vehicles with electric vehicles;
- Conduct a formal waste audit of City operations; and
- Continue implementing the Thurston Climate Mitigation Plan both regionally and as an individual jurisdiction.

Acknowledgments

This report would not have been possible without the members of the City Green Team:

Dan Smith (Water Resources & Sustainability), Troy Niemeyer (Finance), Alyssa Jones Wood (Water Resources & Sustainability), Brad Medrud (Community Development), Brianna Feller (Parks and Recreation) Carrie Gillum (Water Resources & Sustainability), Todd Anderson (Parks and Recreation), Sargent Chuck Liska (Police), Wes Holmgren (Parks and Recreation), Marc Lavack (Transportation & Engineering), Matt Ames (IT), Erika Smith-Erickson (Community Development), Margo Bergendahl (Executive), Mallory Coleman (ASD), and Shane Brady (Fire).

Additionally, community member and Thurston Climate Action Team volunteer Dave Bradley conducted the City operations GHG inventory referenced in this report.