Appendix A – 2019 Sustainability Inventory

Executive Summary

This Appendix presents key data snapshots from Sound Transit's 2019 Annual Sustainability Progress Report, and identifies patterns of resource use compared to earlier years of performance. The report evaluates 2019 performance metrics, as well as performance data trends over multiple years.

The world continues to fight to contain the Covid-19 pandemic as of the release of the 2019 Sustainability Progress Report in July 2020. The pandemic has disrupted most societal routines and has had an outsized impact on transit ridership. Although not apparent in the 2019 data, it is important to anticipate that the pandemic will have significant impacts on ridership and resource consumption data in subsequent years.

Sound Transit has made a number of valuable improvements to the quality and efficiency of its services. In 2019, the agency continued to provide more service while using most resources more efficiently. *The main takeaways from the year include:*

- Ridership in 2019 remained stable, with passenger miles traveled (PMT) across all modes increasing by 2 percent from the prior year and unlinked passenger trips ("boardings") dipping by 1 percent.

- Resource use varied by type. While facility electricity consumption, natural gas consumption and vehicle fuel consumption increased from 2018 to 2019, traction power electricity consumption, water consumption and solid waste generation all declined.

- Total agency greenhouse gas (GHG) emissions decreased 4 percent from 2018 to 2019, as ridership remained steady. This change represents the largest absolute inter-annual GHG emission reduction since 2012. From 2018 to 2019, GHG emissions decreased by 6 percent per PMT.

Additional key findings in resource use and efficiency include:

- Agency wide energy use decreased by 23 percent per PMT since 2011 and 1 percent per PMT from 2018 to 2019.
- Agency natural gas consumption increased 12 percent from 2018 to 2019, due primarily to activity at Central Link Operations and Maintenance Facility (OMF).
- Despite a 2 percent increase in PMT, absolute fleet energy usage only increased 1 percent from 2018 to 2019
- Sounder commuter rail consumed 4 percent more energy in absolute terms in 2019 than 2018, but used 4 percent less energy when normalized by PMT
- Agency greenhouse gas emissions decreased 4 percent in 2019, due largely to Sound Transit's enrollment in the PSE Green Direct renewable energy purchase agreement; Sound Transit has reduced GHG emissions per PMT by 34 percent since 2011
- Water use decreased by 42 percent per PMT since 2010 and 3 percent per PMT from 2018 to 2019.

Notes on Appendix A: This document illustrates resource use trends over time from baseline years (2010 or 2011, depending on data) and the preceding inventory year, 2018. In the following graphs, solid bars indicate total emissions, resource use, and resource costs. The trend lines show the resource use per passenger mile traveled

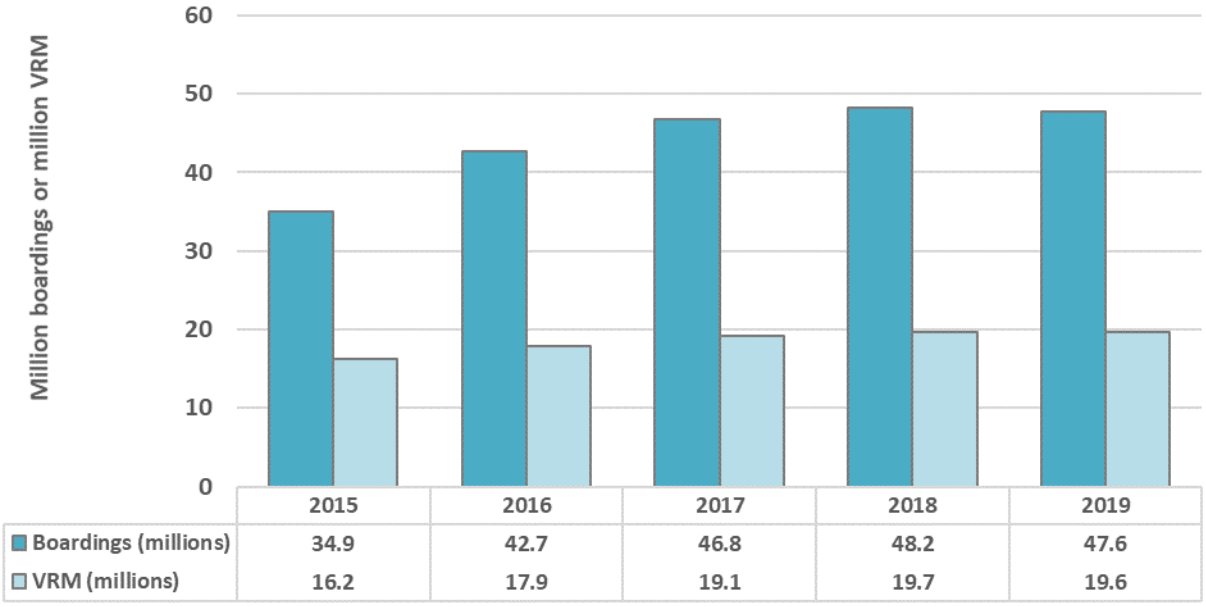
over time. Additionally, please assume that statements in Appendix A regarding resource usage trends and metrics are made in absolute terms unless explicitly stated to be otherwise; normalized trend analyses and metrics will be explicitly labeled as such. (i.e. Greenhouse gas emissions per passenger miles traveled)

Ridership and Level of Service

- Since 2010, ridership measured in boardings has grown by 104 percent.
- Since 2010, vehicle revenue miles have grown by 26 percent.
- From 2018 to 2019, boardings declined by 1 percent but passenger miles traveled increased by 2 percent.

Overall, 2019 ridership figures demonstrates steady ridership compared to previous years. Prior to 2019, ridership in boardings and passenger miles traveled (PMT) had reliably increased year over year. In 2019, agency wide boardings and vehicle revenue miles (VRM) both declined slightly from the prior year. While vehicle revenue miles fell slightly across all services, boardings increased modestly on Central Link and Tacoma Link; boardings on Sounder and ST Express fell 2 and 4 percent, respectively. In 2019, PMT increased modestly on Central Link, Tacoma Link, and Sounder, but fell on ST Express. Figure 1 below shows the trends of boardings and miles of service provided for the past five years.

Figure 1. Ridership, 2015-2019



	2015	2016	2017	2018	2019
Boardings (millions)	34.9	42.7	46.8	48.2	47.6
VRM (millions)	16.2	17.9	19.1	19.7	19.6

Measuring Efficiency

Ridership has important implications for resource use; as the agency grows and serves more passengers, total resource use is expected to increase. To understand the efficiency of its operations as the agency grows, Sound Transit tracks total resource use as well as resource use normalized by passenger boardings, vehicle revenue miles, and passenger miles traveled.

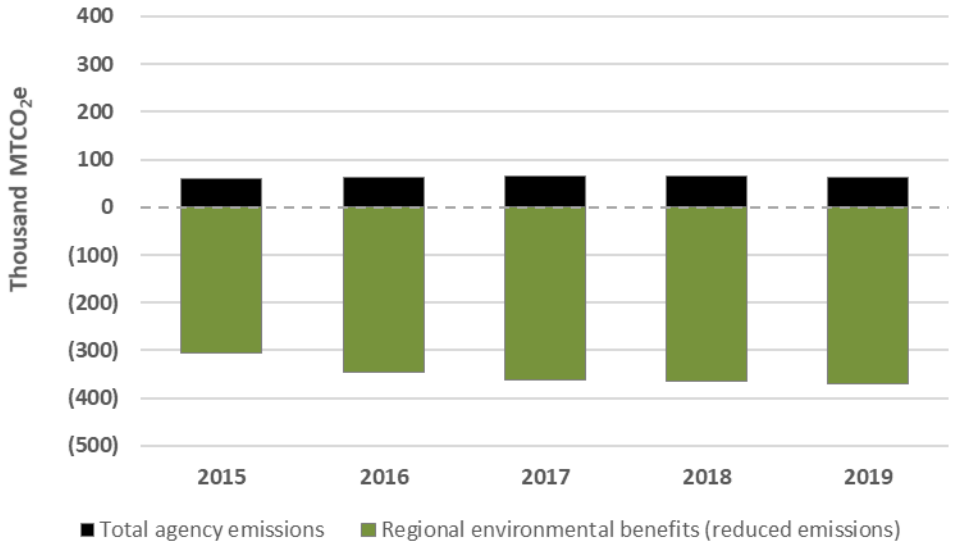
Using National Standards

Sound Transit and the other signatories of the American Public Transportation Association (APTA) Sustainability Commitment use a standard set of metrics developed by APTA to measure annual progress. Passenger miles traveled represents both a measure of boardings and vehicle revenue miles, tracking both growth in service and increases in ridership. Using PMT to normalize data allows Sound Transit to compare resource use over time using a single consistent metric. Therefore, this report normalizes by PMT in nearly all cases. Non-revenue fleet, however, is normalized by employees, as usage is tied more closely to agency staff levels than ridership.

Regional Environmental Benefit

Increased transit use reduces regional environmental impacts from passenger vehicles. As more people choose transit over driving, fuel consumption and greenhouse gas (GHG) emissions are reduced throughout the region. Displaced GHG emission reductions are a measure of the regional environmental benefit produced by transit. Sound Transit follows a methodology developed by APTA and The Climate Registry to account for emission reductions from transit ridership, measured in carbon dioxide equivalent (CO_2e), as shown in Figure 2 and Table 1. GHG emissions can also serve as a proxy for fuel use savings.

Figure 2. Regional Greenhouse Gas Emissions (CO_2e) Displaced by Sound Transit Services, 2015-2019



As seen in Figure 2 above and Table 1 below, Sound Transit services reduce more GHG emissions than they emit in the course of operations. For every ton of GHG emissions Sound Transit emitted in 2019, the region avoided 5.8 tons of emissions through the benefits of transit. The regional environmental benefits shown in Figure 2 (in green) include the benefits from people taking transit instead of driving (mode shift) and reduced emissions associated from denser land use patterns supported by transit; these benefits have consistently been between four and six times the agency's operational emissions (in black) since 2011.

Table 1. Regional Greenhouse Gas Emissions (CO_2e) Displaced by Sound Transit Services, 2019

Regional metric tons CO_2e Reduced		
Mode Shift Benefits	Land-Use Benefits	Total Benefits
69,790	300,235	370,025
Displacement ratios - CO_2e units reduced in the region per unit of CO_2e from Sound Transit operations		
Mode Shift Benefits	Land-Use Benefits	Total Benefits
1.1	4.7	5.8

The definitions for each of the identified types of benefits are below:

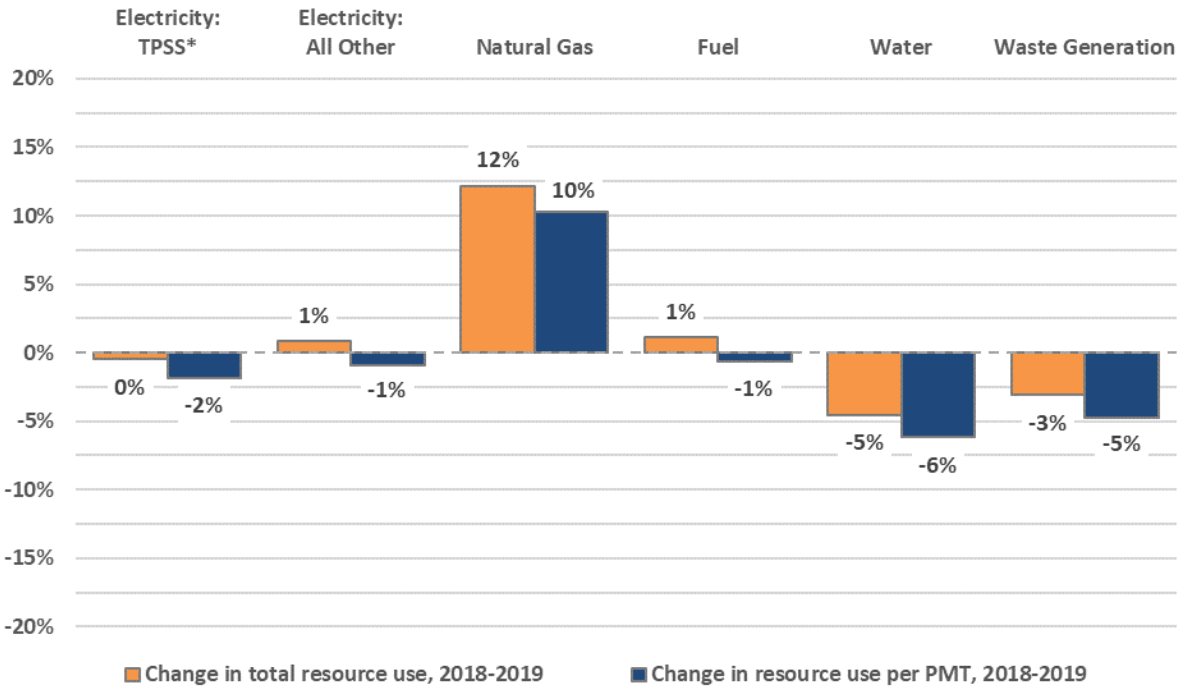
- **Mode shift benefits** measure the reduced GHG emissions (amount displaced) resulting from shifting from one mode of transportation (e.g., single occupancy vehicle) to another (e.g., transit), measured on a PMT basis.
- **Land use change benefits** measure the reduced carbon emissions due to the denser land use patterns supported by transit systems.

Resource Use

Total agency resource use has generally been increasing over time, reflecting Sound Transit's expanded system and services. Most increases in resource use have been in line with service changes and ridership increases as well as operational equipment changes, as described further in the sections below. Figure 3 below shows the change in total resource use from 2018 to 2019, as well as resource use normalized by PMT.

- Absolute resource use for Traction Power electricity (Link light rail propulsion) remained flat from 2018 to 2019, though it declined on a PMT basis. All other electricity consumption showed a 1 percent absolute increase, but a 1 percent decline per PMT.
- Facility natural gas consumption increased substantially, both in absolute and per PMT terms, from 2018-2019. The 12 percent increase in facility natural gas consumption is largely attributable to a growth in gas consumption at Central Link OMF.
- Fuel consumption increased in absolute terms, but declined slightly per PMT.
- Water use declined in both absolute and per PMT terms.
- Waste generation declined in both absolute and per PMT terms.

Figure 3. Change in Total Resource Use, 2018-2019; Change in Resource Use per PMT, 2018-2019



**Note: Electricity: TPSS is normalized by Link PMT, as TPSS is exclusively associated with the Link line of business. All other resource categories are normalized by total agency PMT, as they span multiple lines of business.*

Fleet Energy Use

- Since 2011, total fleet energy use has grown by 22 percent but decreased by 23 percent per PMT.
- From 2018 to 2019, total fleet energy use grew by 1 percent but decreased by 1 percent per PMT.

Fleet energy use (in MMBTU) across Sound Transit's three modes—ST Express bus, Sounder commuter rail, and Link light rail—has been increasing slowly over time as more service has been provided. However, service has become more efficient per passenger and PMT, as system ridership has grown significantly faster than level of service (VRM) and efficiency projects have been implemented.

- Traction power electricity use for Link light rail grew by 154 percent since 2011, but remained roughly the same (decreasing less than a percent) between 2018 and 2019.
- Diesel fuel consumption for Sounder commuter rail increased by 29 percent since 2011 and 4 percent from 2018 to 2019.
    - Sounder commuter rail fuel use has historically varied with changes in weather, as Sounder trains idle when the outside temperature is below 40 degrees F.
    - In 2019, winter temperatures were colder than the previous year; heating degree days increased 4 percent. This partially explains the increase in Sounder fuel consumption.
- Diesel fuel consumption for ST Express buses increased by 8 percent since 2011 and remained flat from 2018 to 2019. The composition of this fuel mix has changed over time; compressed natural gas (CNG) use in ST Express buses has increased by 129 percent since 2011 and by 10 percent from 2018 to 2019.

- CNG use has more than doubled since 2011 and it represented 7 percent of total agency energy use in 2019 (in MMBTU). This increase in CNG since 2011 is largely the result of increased CNG bus purchases. However, from 2018 to 2019, the number of CNG buses remained the same but the mileage driven by the CNG bus fleet increased by more than 6 percent.
- Although using CNG instead of diesel fuel reduces total GHG emissions and most criteria air pollutant emissions including particulate matter (PM) and NO_x, CNG use increases carbon monoxide (CO) emissions. (Air pollutants are discussed on pages A9-12.)

Figure 4 below shows the trend in fleet fuel use over time. Table 2 below shows the percent change in energy use from 2018 to 2019 per mode, as well as the percent change in efficiency (fuel use normalized by PMT for each mode).

Figure 4. Revenue Fleet Energy Use, 2015-2019

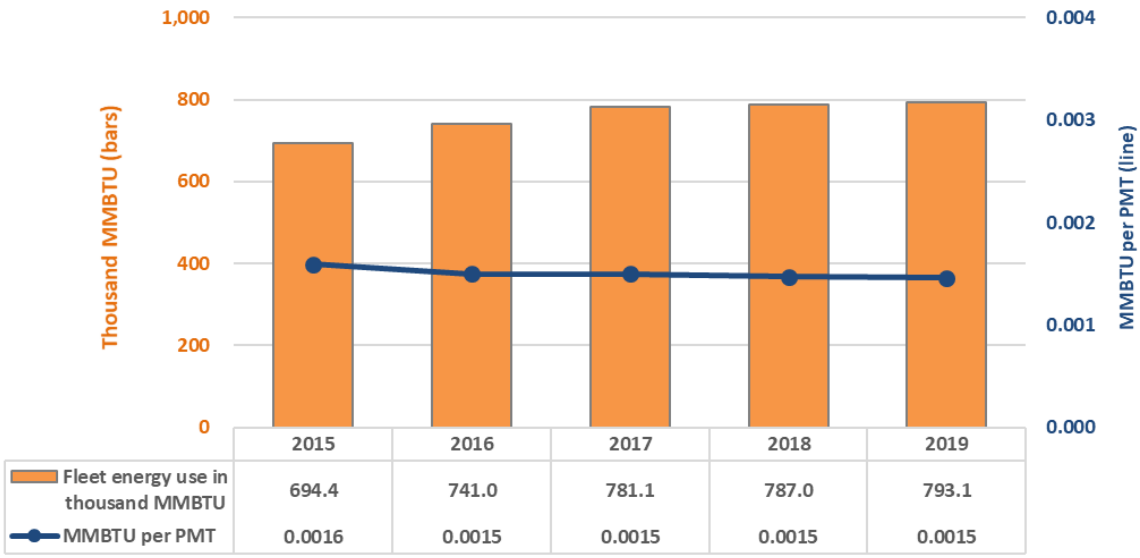


Table 2. Change in Energy Use by Mode, 2018-2019

Mode	% Change in Total Energy Use	% Change in Energy Use per PMT
Sounder Commuter Rail (diesel)	4%	-4%
ST Express Buses (diesel and CNG)	0%	0%
Link light rail traction power (electricity)	0%	-2%

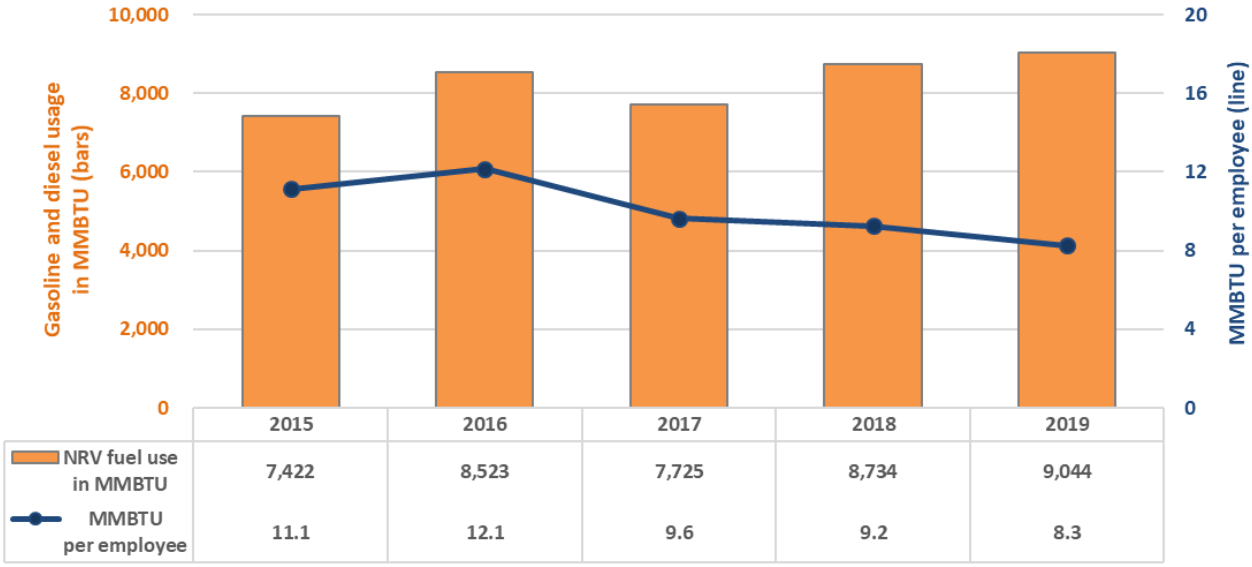
Note: Mode energy use is normalized by PMT specific to each mode.

Non-Revenue Fleet Energy Use

- Since 2011, non-revenue fleet energy use has increased by 14 percent overall but decreased by 45 percent per employee.
- From 2018 to 2019, non-revenue fleet energy use increased by 4 percent in total while decreasing by 11 percent per employee.

Energy use for the agency's non-revenue fleet has remained relatively stable over time, with some fluctuations from year to year, as shown in Figure 5. Non-revenue fleet energy use was 14 percent higher in 2019 than in the 2011 baseline year. While the agency's headcount has increased every year, contributing to more driving, Sound Transit has also purchased more hybrid vehicles, helping to reduce per-mile and per-employee energy use and air pollutant emissions. Prior to the COVID-19 pandemic, the agency encouraged employee use of carpooling or transit whenever feasible.

Figure 5. Non-Revenue Fleet Energy Use, 2015-2019



	2015	2016	2017	2018	2019
NRV fuel use in MMBTU	7,422	8,523	7,725	8,734	9,044
MMBTU per employee	11.1	12.1	9.6	9.2	8.3

Facility Energy Use

- Since 2011, total facility energy use has grown by 23 percent overall and declined by 23 percent per PMT.
- From 2018 to 2019, facility energy use increased by 2 percent overall, but remained roughly flat on a per PMT basis.

As the agency has increased its staff and brought additional stations and facilities online, facility energy use has increased. Sound Transit notably opened the Capitol Hill, University of Washington, and Angle Lake Link light rail stations in 2016. Further development of the Mukilteo station in 2016, with the addition of a second platform, more elevators, and a new pedestrian bridge, also added to energy loads. The next major addition of new facilities will occur in 2021 when the U District, Roosevelt and Northgate Link light rail stations open.

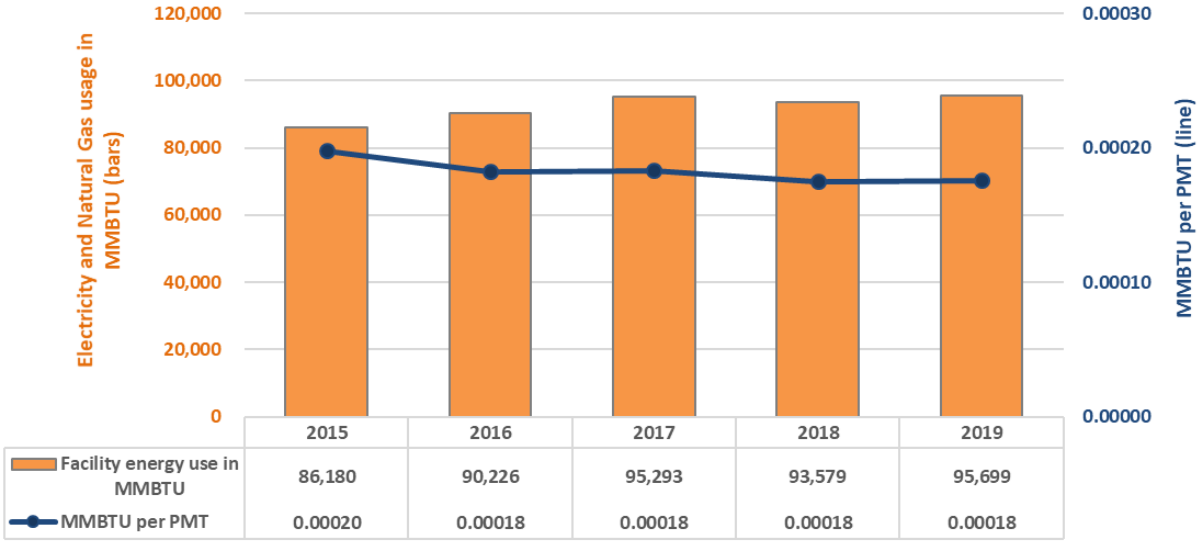
Energy use at certain Sound Transit facilities is also dependent on weather, to an extent. The weather in 2019 was colder than 2018 and likely contributed to the inter-annual increase in facility energy use.

From 2018 to 2019, total facility electricity use increased 4 percent but varied substantially by line of business. Although electricity consumption is subject to external factors like weather and the growth of the network, Sound Transit continues to implement facility energy efficiency measures aimed to reduce agency electricity consumption. Notable electricity consumption trends include:

- Link light rail facilities increased electricity consumption by 9 percent, largely attributable to increased consumption at the Central Link OMF and added consumption at some new facilities.

- Sounder facilities reduced electricity consumption by 16 percent, due to a reduction in wayside power provided to Sounder trains at the Century Yard Operations Building in Lakewood. The Operations department is investigating wayside power electricity consumption on an ongoing basis.
- Across both owned and leased properties, Sound Transit administrative facilities increased consumption by 1 percent.
- ST Express facilities increased consumption by 19 percent, primarily as a result of Community Transit shifting utility payment responsibility for several Snohomish county bus facilities to Sound Transit in 2019.

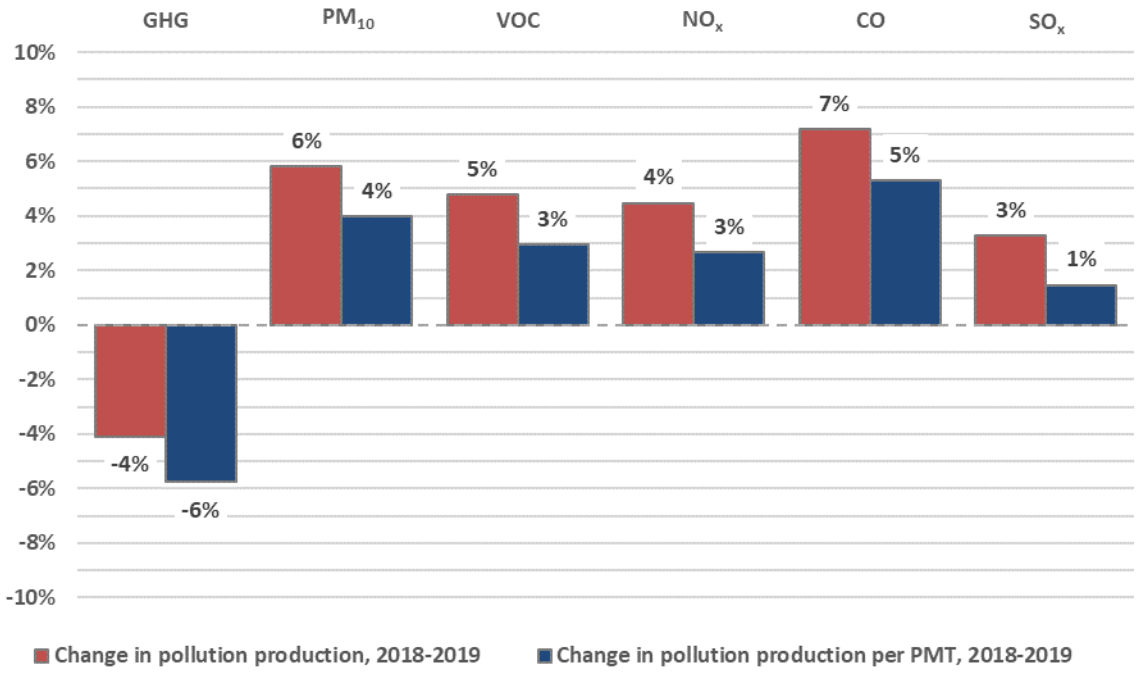
Figure 6. Facility Energy Use, 2015-2019



Air Pollutant Emissions

The sections below illustrate the trends in GHG emissions and criteria air pollutant emissions from Sound Transit vehicle and facility operations. Figure 7 below shows the total percent change and the change normalized per passenger mile traveled (PMT) by pollutant type from 2018 to 2019. As noted above, PMT increased by 2 percent from 2018 to 2019.

Figure 7. Changes in Pollutant Emissions, 2018-2019; Change in Pollutant Emissions per PMT, 2018-2019

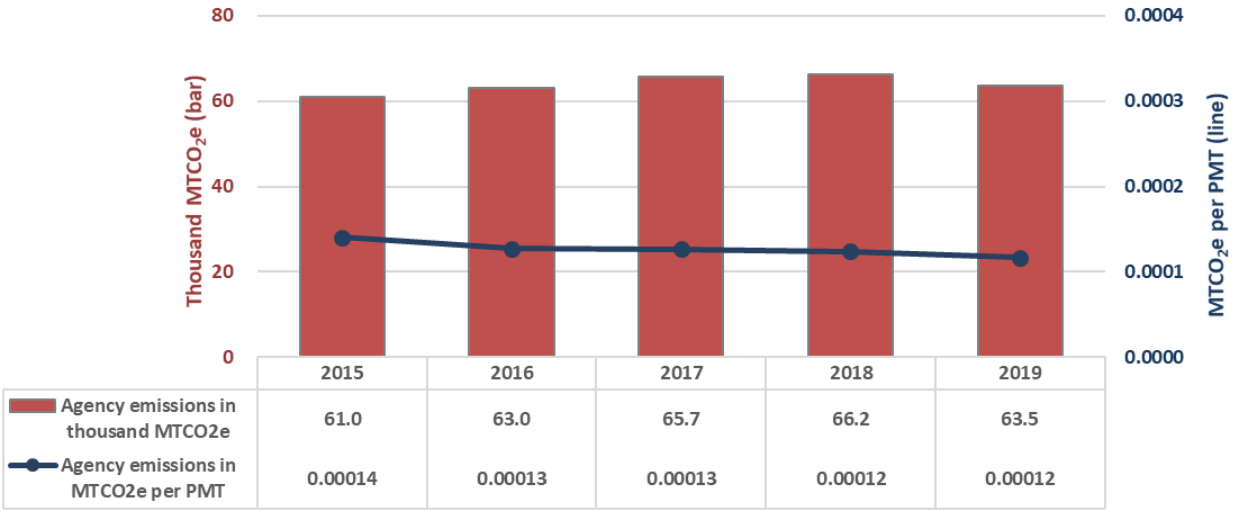


Greenhouse Gas Emissions

- Since 2011, total GHG emissions have grown by 5 percent but decreased by 34 percent per PMT.
- From 2018 to 2019, total GHG emissions decreased by 4 percent and 6 percent per PMT

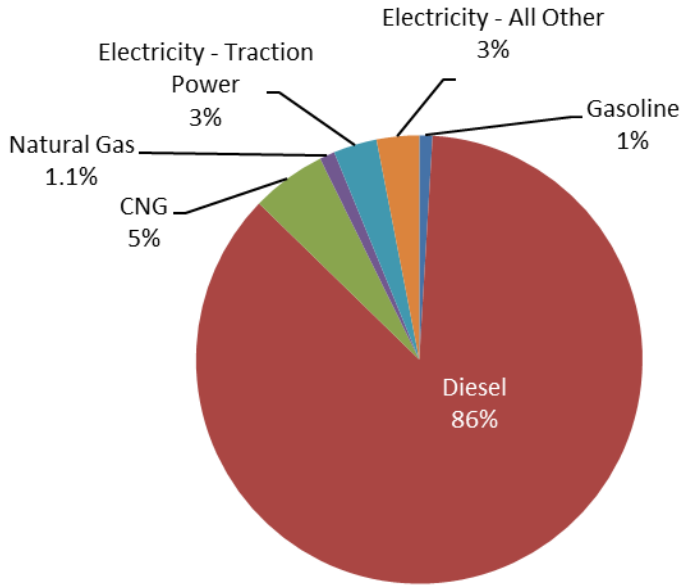
As service and ridership have increased, total agency GHG emissions have remained relatively stable since 2011 and have been declining on a normalized basis, as shown in Figure 8. On July 1st, 2019 Sound Transit commenced enrollment in the PSE Green Direct program to provide 100% renewable electricity to all PSE accounts serving the Central Link light rail. The six months of enrollment for the Green Direct accounts resulted in a 43 percent reduction in traction power GHG emissions from the prior year and 29% percent reduction in total Scope 2 emissions (i.e. emissions from electricity). As shown in Figure 9, the majority of agency GHG emissions are attributable to the combustion of diesel fuel for ST Express and Sounder.

Figure 8. Agency GHG Emissions, 2015-2019 (thousand metric tons of carbon dioxide equivalent, $MTCO_2e$)



	2015	2016	2017	2018	2019
Agency emissions in thousand MTCO2e	61.0	63.0	65.7	66.2	63.5
Agency emissions in MTCO2e per PMT	0.00014	0.00013	0.00013	0.00012	0.00012

Figure 9. Greenhouse Gas Emissions by Energy Source, 2019



Criteria Air Pollutants

Table 3. Change in Criteria Air Pollutant Emissions

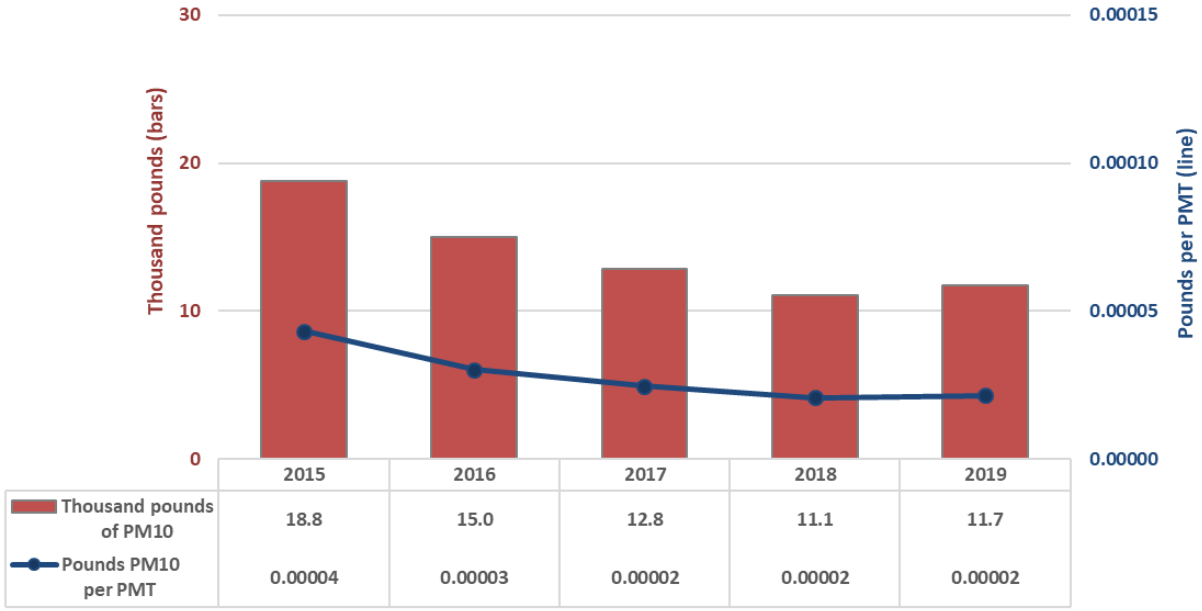
Pollutant	Change 2011-2019 (Absolute)	Change 2011-2019 (per PMT)	Change 2018-2019 (Absolute)	Change 2018-2019 (Per PMT)
PM_{10}	-57%	-73%	+6%	+4%
VOCs	-69%	-80%	+5%	+3%
NO_X	-43%	-64%	+4%	+3%
CO	-76%	-85%	+7%	+5%
SO_X	+27%	-20%	+3%	+1%

Sound Transit's Criteria Air Pollutant (CAP) emissions - particulate matter (PM_{10}), volatile organic compounds (VOCs), nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur oxides (SO_x) – have mostly declined over the past several years. Sound Transit's reduction in CAP emissions is primarily driven by a shift from diesel fuel to CNG in the bus fleet and fleet turnover as older, less efficient vehicles are gradually replaced with newer vehicles with better emissions control technologies. The agency has also upgraded all Sounder commuter rail engines to reduce air pollution.

Figure 10 and Figure 11 below show the decrease in total PM_{10} and CO production over time as well as the decrease per PMT since 2015. These criteria air pollutants are down 57 percent and 76 percent since 2011, respectively.

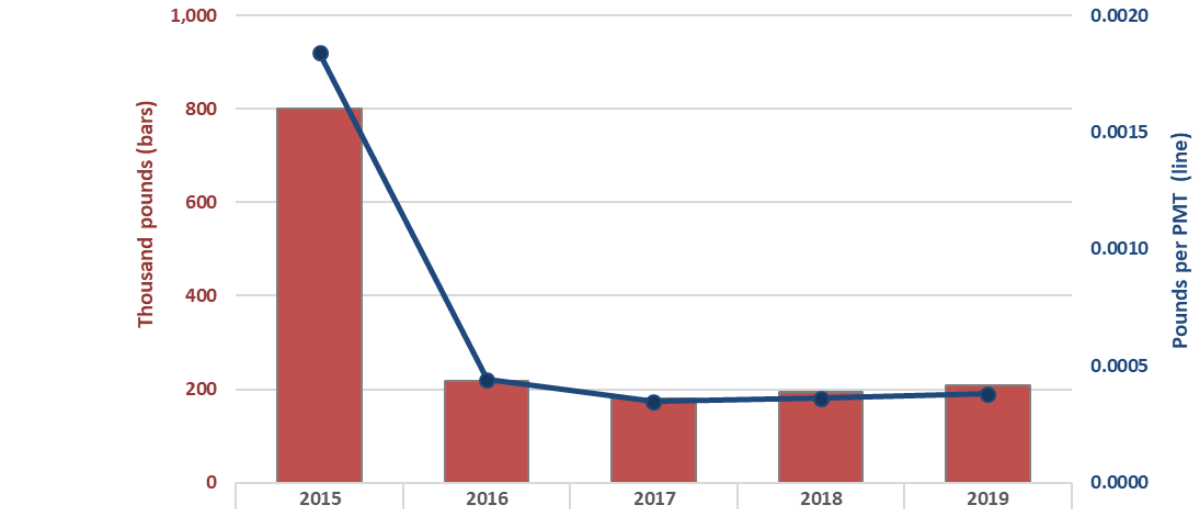
The noticeable drop in CO emissions starting in 2016 is primarily due to phasing out model year 2001 CNG buses. As technology has improved, the CO emissions per mile for CNG buses has dropped dramatically. From 2012-2015, the 2001 CNG buses contributed about 80 percent of total inventory CO emissions. The mileage usage of the 2001 CNG buses stepped down in 2016 and then was eliminated in 2017, accounting for the large drop in CO emissions in those years. As CNG bus mileage continued to increase in 2019, CO emissions also increased proportionately due to the emission characteristics of CNG engines. Emissions of SO_2 increased by 3 percent from 2018 to 2019 due to increased diesel consumption for Sounder service.

Figure 10. Particulate Matter (PM_{10}) Emissions, 2015-2019



	2015	2016	2017	2018	2019
Thousand pounds of PM10	18.8	15.0	12.8	11.1	11.7
Pounds PM10 per PMT	0.00004	0.00003	0.00002	0.00002	0.00002

Figure 11. Carbon Monoxide (CO) Emissions, 2015-2019



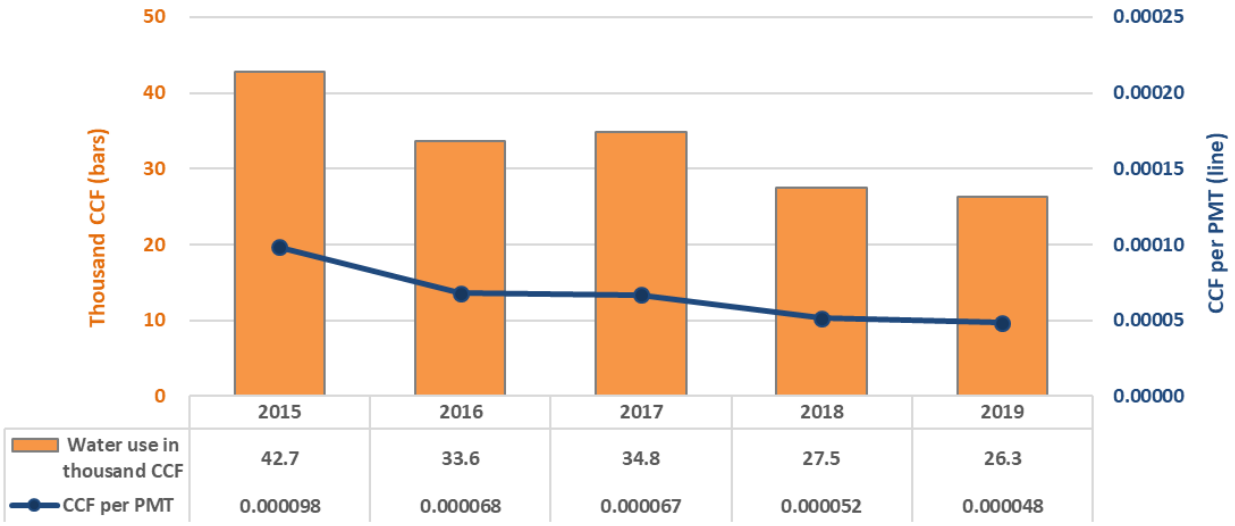
	2015	2016	2017	2018	2019
Thousand pounds of CO	800.5	218.3	180.7	193.4	207.3
Pounds CO per PMT	0.0018	0.0004	0.0003	0.0004	0.0004

Water Use

- Since 2010, water use has grown by 2 percent in total but decreased by 42 percent per PMT.
- From 2018 to 2019, water use decreased by 5 percent in total and 6 percent per PMT.
- Customer facility water use is largely driven by landscape irrigation and is therefore variable from year to year depending on weather.

- Changes in agency water consumption from the prior year varied across agency functions in 2019. While maintenance facilities reduced water consumption 30 percent from the prior year, customer facilities increased consumption 9 percent and administrative facility consumption remained flat.

Figure 12. Water Use, 2015-2019 (thousand CCF; 1 CCF equals 100 cubic feet, or 748 gallons)



Waste Generation

- Since 2010, waste generation has declined by 19 percent.
- From 2018 to 2019, waste generation decreased by 3 percent.

While acknowledging substantial inter-annual variability, waste generation at Sound Transit facilities has declined 19 percent since 2010 as service (vehicle revenue miles) and agency staff have increased. The total amount of garbage sent to landfill has declined 29 percent over the same timeframe, while the rate at which recyclables and compost have been diverted from the landfill has hovered between a low of 27 percent (2010) and a high of 39 percent (2014), achieving a diversion rate of 36 percent in 2019.

It is important to note that in 2018, Sound Transit transferred waste management responsibilities at the Central Link OMF to King County Metro. There is likely some offsetting reduction effect in the waste generation figures in 2018 and 2019 as the waste streams at Central Link OMF are no longer accounted for within the Sound Transit sustainability inventory.

Since 2010, the agency has worked to improve solid waste diversion from landfill by enhancing employee recycling education and implementing paper towel composting in the restrooms at Union Station. In 2016, the disposal bins at the Central Link OMF facility were too small for the volume of garbage, leading to co-mingling of solid waste and recyclables, until bins were upgraded. This problem underscores the importance of ongoing assessment and education, as well as appropriate infrastructure, to support recycling and composting efforts.

- From 2018 to 2019, waste generation decreased by 18 tons, or 3 percent, while the administrative headcount increased by 16 percent in that timeframe.

- Composting quantities in 2019 increased 4 tons (3 percent) from the prior year, while recycling quantities decreased 2 tons (1 percent). The agency's total diversion rate during that period increased from 35 to 36 percent, as pictured in Figure 13 below.
- Waste diversion rates for central office facilities are substantially higher than for other facilities. As depicted in Table 4 below, the diversion rate from landfill for central office facilities has remained in the 60-64% range since 2015.

Figure 13. Waste Generation and Diversion, 2015-2019

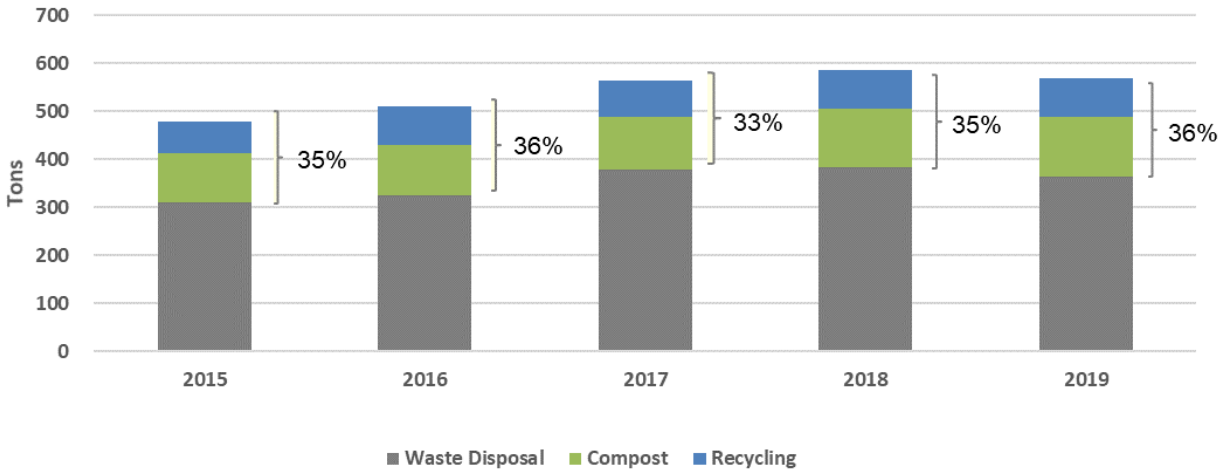


Table 4. Waste Diversion Rates by Facility Type

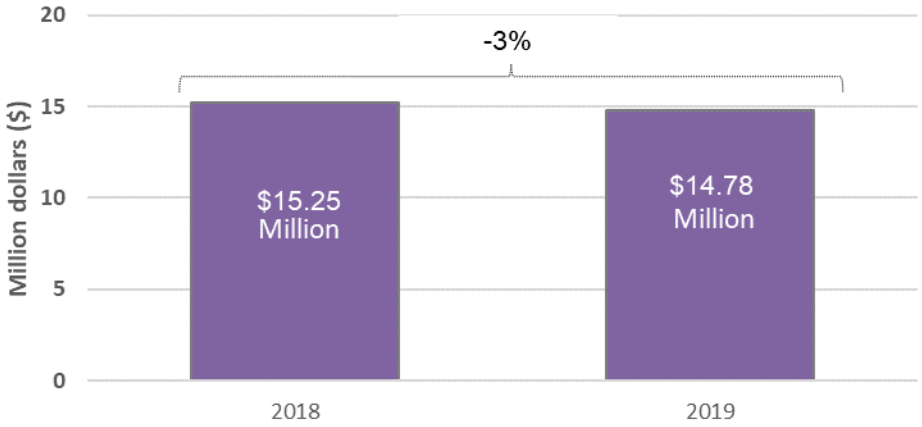
Year	Central Office	Other Facilities	Total
2015	64%	25%	35%
2016	66%	24%	36%
2017	61%	22%	33%
2018	60%	23%	35%
2019	61%	24%	36%

Fuel and Utility Expenses

- Since 2010, fuel costs for ST Express buses and Sounder commuter rail have decreased 1 percent in total and 34 percent per PMT.
- From 2018 to 2019, fuel costs decreased by 6 percent in total and 8 percent per PMT.
- Since 2010, utility costs have increased by 114 percent in total and 22 percent per PMT.
- From 2018 to 2019, utility costs increased by 4 percent in total and 3 percent per PMT.

Resource costs across categories have generally trended upward since 2010. Figure 14 below shows the change in agency operating costs for fuel and utilities from 2018 to 2019. Passenger miles traveled increased by 2 percent in this period.

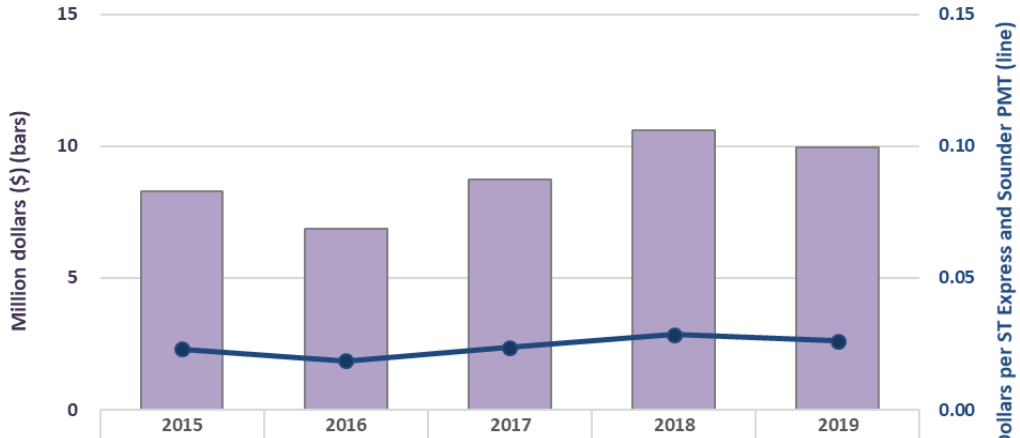
Figure 14. Fuel and Utility Expenses



Fuel Costs

- Fuel costs for ST Express buses and Sounder commuter rail have decreased by 1 percent since 2010 and by 6 percent from 2018 to 2019.
- Transit vehicle fuel makes up the bulk of Sound Transit's fuel and utility expenses; fuel use accounted for 67 percent of the agency's fuel and utility expenses in 2019.
- In 2019, transit vehicle fuel expenses accounted for 3 percent of Sound Transit's total operating budget.

Figure 15. Sounder and ST Express Fuel Costs, 2015-2019



	2015	2016	2017	2018	2019
Fuel costs in millions of dollars ($)	$8.29	$6.87	$8.72	$10.62	$9.94
Dollars per ST Express and Sounder PMT	0.023	0.019	0.024	0.029	0.026

Other Utility Expenses

- Since 2010, utility costs have increased by 114 percent overall and increased by 4 percent from 2018 to 2019.

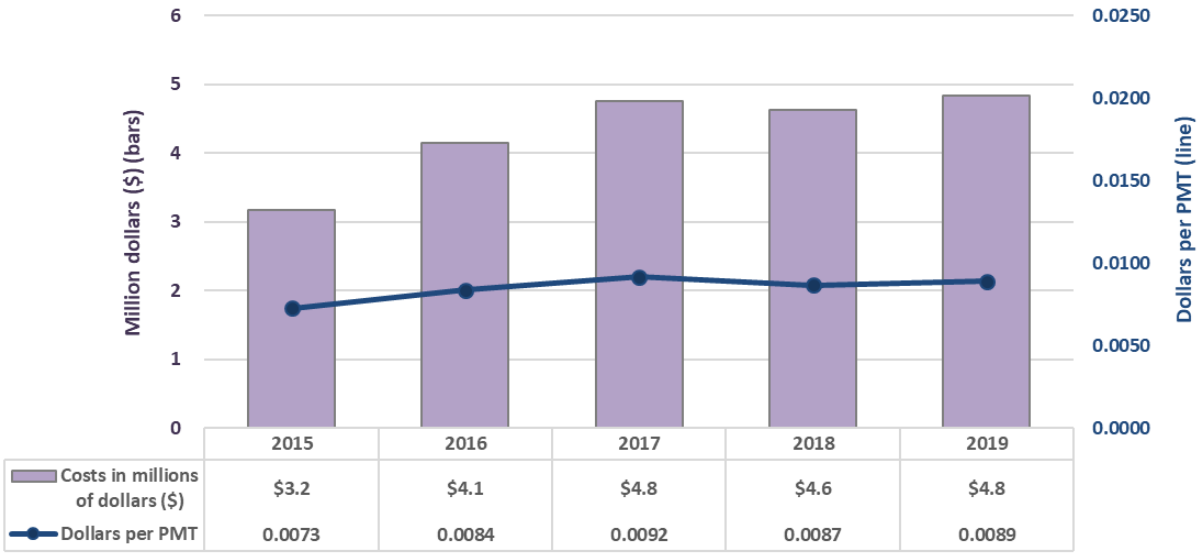
Table 5. Change in Utility Costs

	Change 2010-2019 (Absolute)	Change 2010-2019 (per PMT)	Change 2018-2019 (Absolute)	Change 2018-2019 (Per PMT)
Traction power electricity costs	+183%	-3%*	+5%	+4%*
Facility electricity costs	+82%	+3%	+7%	+5%
Facility natural gas costs	+51%	-14%	+2%	0%
Water costs	-4%	-45%	-9%	-10%
Waste, recycling, and compost cost	+123%	+27%	-11%	-12%

**Reduction per Link passenger mile traveled.*

Other utility expenses for electricity, water, and waste have increased over time in line with usage trends. Figure 16 below shows the change in resource costs since 2015. Total facility electricity costs since 2010 have increased by 82 percent and waste costs have increased by 123 percent. Water costs have declined by 4 percent during that period, but experience inter-annual volatility. The agency's fuel expenses have fluctuated with the volatility in petroleum prices, while other resource costs have increased more steadily.

Figure 16. Utility Costs (excluding transit vehicle fuel), 2015-2019



Note: Stormwater and sewer costs are not included.

Appendix B – 2019 Sustainability costs and savings

The table below summarizes a sample of costs and savings from resource conservation projects completed as of the end of 2019. This data captures many significant monetary costs and savings. However, projects may have additional sustainability benefits that cannot be represented as financial savings – from reduced maintenance cycles to improved air quality.

Note that the savings figures below do not include labor and material cost savings related to improved operations and maintenance efficiency. Payback year estimates do reflect applicable grants and or rebates. Many projects with long payback periods still incur significant labor and material cost savings and reduce the frequency of maintenance.

PROJECT	PROJECT FINISHED	CAPITAL COSTS	2019 SAVINGS	SAVINGS TO DATE, 2019	PAY-BACK YEAR	DESCRIPTION
ST Express mid-day bus storage	2008	$0	$76,583	$2,015,059	2008	This program allows Pierce County buses to stay in Seattle until the afternoon commute to avoid driving back and forth empty – saving over 46,000 gallons of fuel in 2018.
Sounder Automatic Engine Start-Stop System	2009	$230,596	$146,814	$936,552	2013	This equipment was installed to shut down Sounder commuter rail engines when not in use, and reduces engine idling time by about 34 percent and significantly reduces air pollution.
Sounder Lakewood-Seattle wayside power	2010	$490,000	$109,970	$972,361	2015	Electric wayside power units are used instead of the commuter rail locomotives' diesel engines to heat and power coach cars during layover, reducing diesel use and air pollutant emissions. Wayside units were installed in Tacoma in 2010 and were then moved to Lakewood in 2013, where more units were added.
Sounder Everett-Seattle wayside power	2011	$315,000	$16,458	$245,059	2019	
Central Link OMF sewer deduct meter	2012	$2,600	$26,774	$231,902	2012	This Central Link light rail Operations and Maintenance Facility meter reduces water costs by accounting for irrigation water that does not enter the wastewater stream.
Union Station HVAC Controls Upgrade*	2013	$405,778	$25,581	$153,559	2022	The agency upgraded the controls for the Union Station Heating, Ventilation and Cooling (HVAC) system.
Federal Way Transit Center garage lighting upgrades*	2013	$579,334	$32,436	$194,702	2023	Three transit facility garages were retrofitted for LED lighting. These locations included Federal Way Transit Center, Kent Sounder station and Auburn Sounder station.

PROJECT	PROJECT FINISHED	CAPITAL COSTS	2019 SAVINGS	SAVINGS TO DATE, 2019	PAY-BACK YEAR	DESCRIPTION
Kent Station garage lighting upgrades*	2013	$99,773	$5,766	$34,614	2022	
Auburn Station garage lighting upgrades*	2013	$208,985	$11,533	$69,227	2023	
Angle Lake Station Solar Power	2016	N/A – Installed as part of Design Build project	$1,440	$4,851	N/A	14 KW solar array system on the Angle Lake Station platform canopy and 50 KW solar array system on the Angle Lake Garage pedestrian walkway. These solar panels were installed in the original design build contract for the facility.
Angle Lake Garage Solar Power	2016		$4,527	$14,331	N/A	
Kent Station lighting upgrades*	2017	$169,849	$10,210	$28,168	2030	Kent, Sumner and Puyallup Stations were upgraded with LED lighting.
Sumner Station lighting upgrades*	2017	$138,967	$10,250	$28,279	2027	
Puyallup Station lighting upgrades*	2017	$169,849	$10,622	$29,305	2029	
OMF Interior and Exterior LED Lighting & EMS Controls Upgrade*	2018	$1,065,415	$70,944	$127,505	2026	The building control system was upgraded at the Operations & Maintenance Facility, which allows for improved building mechanical operations. The inefficient lighting was replaced with LED in the maintenance shop and exterior parking areas.
Mukilteo Parking Lot lighting upgrade	2018	$13,150	$3,558	$5,644	2021	Parking lot lighting was retrofitted with LED lights near Mukilteo Station.
Issaquah Transit Center lighting upgrade*	2018	$161,514	$8,921	$14,054	2035	Lighting was upgraded to LEDs at the Issaquah Transit Center, Mercer Island Park & Ride, and King St. Stations from parking garages and station platforms to area lighting.
Mercer Island Park & Ride Lighting Upgrade*	2018	$191,424	$8,402	$12,983	2038	
King St. Station Lighting Upgrade*	2018	$245,262	$4,966	$4,966	2068	

PROJECT	PROJECT FINISHED	CAPITAL COSTS	2019 SAVINGS	SAVINGS TO DATE, 2019	PAY-BACK YEAR	DESCRIPTION
Sounder Yard Solar	2018	N/A - Installed as part of Design Build project	$208	$388	N/A	2.1 KW solar array system on the Sounder Yard facility. These solar panels were installed in the original design build contract for the facility.
Light Rail Vehicles Lighting Upgrade	2019	$137,022	$18,782	$18,782	2024	Interior lighting and headlights on Link Light Rail were upgraded to LED, which reduced lighting energy use by 45%. The project also improved visibility and reduced maintenance requirements for the lighting system. Sound Transit 2019 Sustainability Trends Memo – Appendix
Light Rail Vehicles Oil-less Compressors	2019	$650,100	$14,069	$14,069	2039	Compressors on 62 Link Light Rail vehicles were upgraded with oil-less compressors as part of their lifecycle replacement. The new compressors do not use any oil, reduce maintenance costs and improve reliability.
Edmonds Station Parking Lot Lighting Upgrade	2019	$4,836	$1,054	$1,054	2022	Facilities retrofitted (24) 250 watt metal halide parking lot lights with 100 watt LED lights. The new lights use 60% less energy and require significantly less maintenance.

* Cost savings figures for projects implemented through an Energy Performance Contract (denoted with an *) represent average, annualized savings based on the project's projected lifetime savings. These projects may ultimately achieve energy and cost savings in excess of the guaranteed amount.

Appendix C – 2019 Key Performance Indicators

The table below presents the Key Performance Indicators (KPIs), as defined in the 2019 Sustainability Plan. The table also show the KPI's in relation to their associated Priorities, Long-term goals and Short-term goals, per the Plan. The KPIs reflect current progress compared to the 2019 Sustainability Plan's baseline year of 2018. Note that the KPIs below are a subset of the 2019 Sustainability Plan's metrics.

PRIORITY	LONG-TERM GOALS	APPLICABLE SHORT-TERM GOALS	KEY PERFORANCE INDICATOR	2018 BASELINE VALUE	2019 VALUE AND/OR PERCENT CHANGE
People	Social equity addressed and implemented as an agency value	Contribute to a revolving loan fund for affordable housing revolving loan fund	# of dollars contributed to affordable housing revolving loan fund	Contributions began in 2019	$4 million
		Build staff awareness and capacity to integrate equity into all business lines	% of staff trained in equity and inclusion	37% of staff trained	32% of staff trained
		Meet or exceed workforce diversity goals for construction contractors Goals: • 21% people of color • 12% women • 20% apprentices	% of hours worked by diverse communities on ST job sites	• 29% by people of color • 7% by women • 20% by apprentices	• 27% by people of color • 7% by women • 21% by apprentices
	All staff champion sustainability	Certify key staff to green design and building management professional accreditations	# of staff trained to sustainable professional accreditations	• 22 new Envision Sustainability Professionals • 17 new LEED Accredited Professionals • 5 other new sustainability certifications	• 30 new Envision Sustainability Professionals • 18 new LEED Accredited Professionals • 8 other new sustainability certifications

PRIORITY	LONG-TERM GOALS	APPLICABLE SHORT-TERM GOALS	KEY PERFORANCE INDICATOR	2018 BASELINE VALUE	2019 VALUE AND/OR PERCENT CHANGE
Planet	Achieve carbon free operations	Reduce greenhouse gas emissions by 10 percent	% change in greenhouse gas emissions	66,206 tonnes of CO2e	63,498 tonnes of CO2e; 4% reduction since 2018
			% change in criteria air pollutants	• Particulate Matter: 11,078 lbs • Volatile Organic Compounds: 15,485 lbs • NOx: 399,828 lbs • CO: 193,411 lbs • SOx: 9,986 lbs	• Particulate Matter: 11,722 lbs; 6% increase since 2018 • Volatile Organic Compounds: 16,224 lbs; 5% increase since 2018 • NOx: 417,704 lbs; 4% increase since 2018 • CO: 207,290 lbs; 7% increase since 2018 • SOx: 10,313 lbs; 3% increase since 2018
		Increase production from solar panels to 750 KW	# of kW of renewable energy production	• 76,257 kWh produced • 2.1 KW installed	• 72,210 kWh produced
		Purchase available cost-effective, carbon-free electricity	% change in renewable electricity procurement	84% electricity from clean and renewable sources	89% electricity from renewables in 2019; 6% increase since 2018
		Decrease total energy use 5 percent for all facilities built before 2018	% of facility energy reduced	170,648 MMBtu	169,196 MMBtu; 1% reduction since 2018
	Enhance ecosystem functions	Achieve 100 percent environmental compliance (zero fineable violations)	# of fineable environmental compliance violations	Four	Zero
		Reduce total water use by 10 percent at all existing facilities and sites established before 2018	% change in agency water use	27,521 CCF used	26,275 CCF used; 5% reduction since 2018

PRIORITY	LONG-TERM GOALS	APPLICABLE SHORT-TERM GOALS	KEY PERFORANCE INDICATOR	2018 BASELINE VALUE	2019 VALUE AND/OR PERCENT CHANGE
Prosperity	Build resilience to climate change and natural or manmade disasters	Develop staff awareness of individual roles in emergency prepared	% of staff trained in emergency preparedness	Training began in 2018	37% of staff trained
		Conduct a Climate Vulnerability Assessment as part of each major system capital expansion project	% of projects that include Climate Change Vulnerability Assessments	Assessments began in 2019	100% of eligible projects
	Maximize operational efficiency	Divert 50 percent of office waste to recycling or compost	% of waste diverted	35%	36%; 3% improvement in diversion
		Include green methods or features in at least 75 percent of all new agency procurements	% increase in # of and dollar value of procurements	• 15% of new procurements • $299M in value	• 23 procurements – 19% overall and a 92% increase since 2018 • $153M in value – 48% change since 2018