

Virtual Meeting Participation Information:
Dial: 1-253-215-8782 Meeting ID No. 84134942082
Webinar link: <https://us02web.zoom.us/j/84134942082>

Physical Meeting Location:
Pierce Transit Training Center
3720 96th Street SW
Lakewood, WA 98499

Call to Order

Approval of Minutes – March 16, 2023, committee meeting

Public Comment:

Citizens wishing to provide comment will be given up to three minutes to comment on transit-related matters regardless of whether it is an agenda item or not. The Chair, at his or her discretion, may reduce the comment time to allow sufficient time for the Board to conduct business.

*To request to speak virtually during public comment, please press the Raise Hand button near the bottom of your Zoom window or press *9 on your phone. If speaking in person, please sign in at the table at the back of the room. Your name or the last four digits of your phone number will be called out when it is your turn to speak. Written comments may also be emailed to Djacobson@piercetransit.org.*

Action Agenda

1. FS 2023-029, Authorize the Chief Executive Officer to Increase Contract 1019 with All StarZ Staffing and Consulting, Inc., to Continue Providing Temporary Staffing for Bus Cleaning Custodians and Other Temporary Staffing Needs Randal Schultz
Human Resources Assistant Manager

Review/Discussion

1. 2023 Q2 Quarterly Financial Report Chris Schuler
Chief Financial Officer
2. 2022 Sustainability Report Pamela Gant
Data Analyst

Commissioner Comments

Executive Session – None Scheduled

Adjournment

Pierce Transit does not discriminate on the basis of disability in any of its programs, activities, or services. To request this information in an alternative format or to request a reasonable accommodation, please contact the Clerk's Office at 253.581.8066, before 4:00 p.m., no later than the Tuesday preceding the Board meeting.

**PIERCE TRANSIT
EXECUTIVE FINANCE COMMITTEE MEETING**

March 16, 2023

MINUTES

CALL TO ORDER

Chair Whalen called the meeting to order at 3:02 p.m.

ATTENDANCE

Executive Finance Committee Commissioners present:

Marty Campbell, Pierce County Council, Vice Chair
John Hines, City of Tacoma
Ryan Mello, Pierce County Council
Jason Whalen, Mayor of City of Lakewood, Chair

Staff present:

Mike Griffus, Chief Executive Officer
Chris Schuler, Chief Financial Officer
Brittany Carbullido, Assistant to the CEO/Deputy Clerk of the Board
Deanne Jacobson, Clerk of the Board

OPENING REMARKS AND HOUSEKEEPING

Chair Whalen welcomed committee members, staff, and citizens to the virtual meeting and provided instructions for participation to attendees.

APPROVAL OF MINUTES

Commissioners Campbell and Mello **moved** and seconded to approve the January 19, 2023, Executive Finance Committee meeting minutes as presented.

Motion **carried**, 4-0.

PUBLIC COMMENT

No public comments were received.

ACTION AGENDA

FS 2023-013, Authority to Execute a Contract with Sequoyah Electric, LLC., Contract No. 1631, for Construction and Infrastructure Work for the Installation Three Electric Charging Stations at the Commerce Street Bus Facility

Senior Project Manager Monica Adams presented on the item and reviewed the schematic markup depicting the placement of the electric charging stations at Commerce Street Bus Facility and providing an overview of the security measures that will be incorporated and the charging capabilities of the charging stations. She advised that operators will be able to plug in the coaches to the charging stations and will receive the appropriate training to perform this function.

Staff responded to questions relating to the charging capabilities of the charging stations.

Commissioners Campbell and Hines **moved** and seconded to authorize the Chief Executive Officer to enter into and execute a contract with Sequoyah Electric, LLC., Contract No. 1631, to provide construction and infrastructure work for the installation of three (3) electric charging stations at the Commerce Street Bus Facility for a total contract spending authority amount of \$403,998.00.

Motion **carried**, 4-0.

REVIEW AND DISCUSSION

Proposed Bus Shelter Design

Senior Project Manager Monica Adams presented on the item and advised that a shelter design was presented to the Board about a year ago. Staff has gone back to rework the project and has determined that replacement instead of refurbishment of the bus shelters would be more feasible.

She reviewed the current design and conditions of the shelters as well as costs associated with repairing vandalism to the shelters. She reviewed the types of shelters the agency considered and why they were ruled out. She advised that the agency is trying to stay with the original footprint of the existing shelters to save costs.

Ms. Adams also advised that the Community Transportation Advisory Group reviewed the proposed shelter design and had no strong opinion on the design.

Ms. Adams reported that there is enough funding to replace approximately 100 of the 521 shelters in that are in the Pierce Transit system. She reviewed the recommended style, which consisted of smaller glass panes, and advised that the design is supported by the Maintenance Department. She advised that Pierce Transit would need to receive grant funds or reprioritize existing capital projects to replace the remaining shelters.

A question and answer ensued between staff and the commissioners with commissioners overall supportive of the proposed shelter design. Suggestions were made to consider the use of expanded metal or perforated metal, where appropriate.

It was also suggested that staff look into whether the old shelters could be recycled or utilized by other public agencies.

Commissioner Mello thanked CEO Griffus and staff for reworking the shelter design proposal and looking at other options and noted that he is happy with the direction of these shelters and that staff is actively seeking funding.

Ms. Adams responded to questions as to why the agency settled on black shelters and the agency's branding colors.

Upon inquiry regarding the design schemes of the BRT shelters, Ms. Adams advised that the BRT stations will have a unique design and will not look like the regular shelters. Staff was encouraged to apply the same universal concepts of cost savings to the BRT shelters.

Chair Whalen inquired about the maintenance costs associated with the smaller pane windows versus the cost of perforated metal and expressed that he still has concerns about the costs for repairing glass shelters from vandalism. Staff advised that they will provide the cost information and that this item is expected to return to the full Board in May or June for award of the installation contract.

COMMISSIONER COMMENTS

The commissioners announced upcoming city events that will be held.

EXECUTIVE SESSION

No executive session was scheduled.

ADJOURNMENT

There being no further business before the committee, the meeting was adjourned at 3:41 p.m.

Deanne Jacobson
Clerk of the Board

Jason Whalen, Chair
Executive Finance Committee

TITLE: Authorize the Chief Executive Officer to Increase Contract 1019 with All StarZ Staffing and Consulting, Inc., to Continue Providing Temporary Staffing for Bus Cleaning Custodians and other Temporary Staffing Needs

DIVISION: Administration

SUBMITTED BY: Randal Schultz, Human Resources Assistant Manager

RELATED ACTION:

FS 2022-065, Authorize the Chief Executive Officer to increase Contract 1019 with All StarZ Staffing and Consulting, Inc. to Continue Providing Temporary Staffing for Bus Cleaning Custodians

ATTACHMENTS: N/A

RELATION TO STRATEGIC PLAN: Customer

BUDGET INFORMATION

Is it Budgeted? Yes / No

Project Name or Number:

Operating Budget

Capital Budget

FUNDING SOURCE:		EXPLANATION:
Original Contract Amount	\$ 30,000	Funds will be reallocated from the Operating Budget utilizing funds from unfilled positions.
Previous Contract Increases	\$ 370,000	
This Increase Amount	\$ \$200,000	
New Contract Amount	\$ 600,000	

BACKGROUND:

After initiating a competitive bid process in April 2020, Pierce Transit executed a contract with All StarZ Staffing and Consulting to provide temporary staffing for bus cleaning custodians and other temporary staffing positions.

Shortly after contract execution, All StarZ fulfilled our request for bus cleaning custodians on base, due to staffing shortages. Due to COVID-19 prevention requirements, the need for bus cleaning increased throughout 2021 and 2022, which caused the contract to be increased up to the Chief Executive Officer’s authority of \$200,000.

On November 17, 2022, the Board approved an increase to All StarZ contract in the amount of \$200,000 for a total authorized contract spending amount of \$400,000 to cover temporary staffing costs through 2023 due to labor shortages experienced in the Bus Custodian/Fleet Care Attendant field and to fulfill bus cleaning services. All StarZ has also provided minimal temporary staffing support to the Information Technology and the Service and Delivery Customer Service departments on an as needed basis.

Pierce Transit is seeing improvements in staffing levels for the Bus Custodians and has been able to absorb some of the bus cleaning services in-house; however, the agency is still experiencing staffing shortages and needs additional assistance from temporary staffing agencies until the labor market returns to more predictable, healthy levels.

This request is to increase the contract spending authority amount by an additional \$200,000, for a new contract authority amount of \$600,000 to cover primarily bus cleaning custodian services, and temporary staffing needs that may unpredictably occur across the agency as needed through the end of 2024.

ALTERNATIVES:

Do not authorize the contract increase, which would create an unhealthy situation for our riders, and would not provide a resource for temporary staffing for other departments as needed.

RECOMMENDATION:

Authorize the contract increase to continue providing bus cleaning services and other temporary staffing positions as needed.

PROPOSED MOTION:

Move to: Authorize the Chief Executive Officer to increase Contract 1019 with All StarZ Staffing and Consulting, Inc., by up to \$200,000, for a new contract spending authority amount of \$600,000 to continue providing temporary staffing services primarily for bus cleaning custodians and other agency temporary staffing positions on an as needed basis.

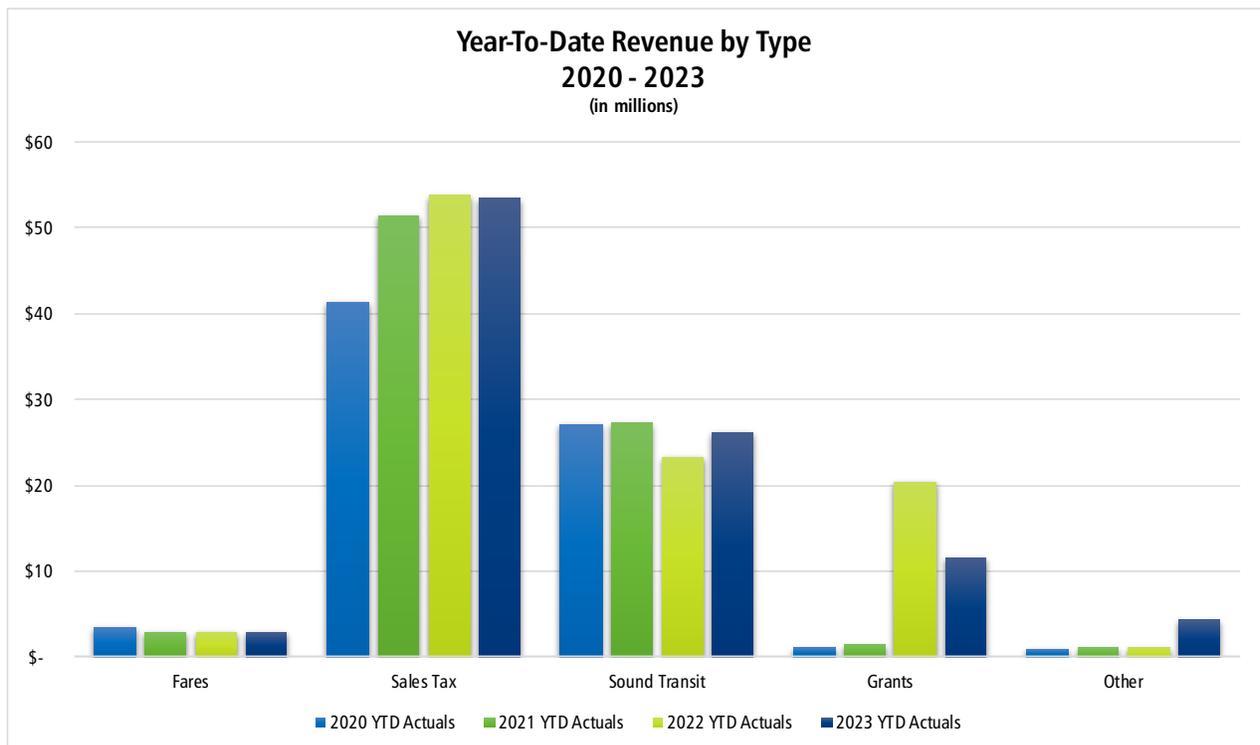
Pierce Transit
Quarterly Financial Report
01.01.2023 – 06.30.2023



Operating Revenues

As of June 30th, Pierce Transit has received 55.75% of the budgeted revenue. A comparison of operating revenue for three prior years and the 2023 Budget to Actuals are provided in the table below. The 2023 budget numbers are for the full year whereas actuals for each year reflect activity January 1st through June 30th.

	2020	2021	2022	2023		% of Budget Received
	YTD Actuals	YTD Actuals	YTD Actuals	Budget	YTD Actuals	
Fares	\$ 3,478,041	\$ 2,908,164	\$ 2,874,109	\$ 5,446,210	\$ 2,924,666	53.70%
Sales Tax	41,293,040	51,396,119	53,754,544	\$ 110,557,130	53,348,047	48.25%
Sound Transit	27,016,059	27,270,765	23,267,777	\$ 47,986,720	26,143,115	54.48%
Grants	1,107,925	1,476,214	20,384,815	\$ 10,795,670	11,566,145	107.14%
Other	900,320	1,063,161	980,147	\$ 1,623,270	4,372,915	269.39%
Total Operating Revenues	\$ 73,795,385	\$ 84,114,423	\$ 101,261,391	\$ 176,409,000	\$ 98,354,887	55.75%



Highlights from 2nd Quarter:

Other revenue has the largest gains over budget. The majority is earned interest on investments fueled by higher interest rates. Grant reimbursements are also above budget. Approximately 86% is attributed the remaining ARPA and Youth Ride Free funding. Sound Transit reimbursement and Fares are performing at the expected budgeted amounts. Sales Tax has slowed in the 2nd quarter, coming in slightly under 50% of the budget.

Revenue Definitions

Fares – Revenues for actual services provided and include fixed route, SHUTTLE and Vanpool services. The current average fare per boarding is \$0.86. The last adult fare increase was in 2010.

Sales Tax – This revenue source provides most of our operating revenue and is based on taxable sales within the Pierce Transit Public Transportation Benefit Area. Currently, Pierce Transit only collects 0.6% of the 0.9% allowable sales tax rate.

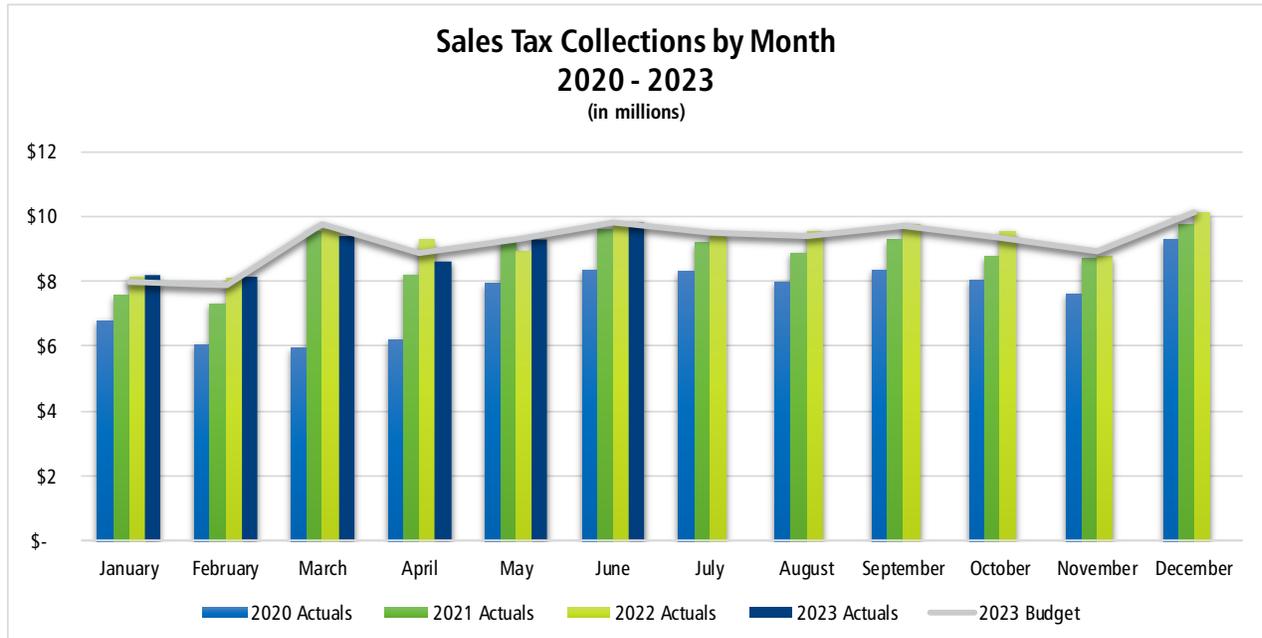
Sound Transit – Are reimbursable expenses for Pierce Transit providing regional transit service from Pierce to King County on behalf of Sound Transit. Reimbursements are based on the costs of services at an hourly rate for service hours required to provide the service.

Grants – Revenues to offset costs of running services. Included in grant revenues are Commute Trip Reduction and Special Needs Operations. These revenues are provided by Pierce County and Washington State.

Other – Other includes interest and advertising revenues that are received with more consistency as well as revenues that cannot be classified in one of the other revenue types.

Sales Tax Collections by Month

	2020 Actuals	2021 Actuals	2022 Actuals	2023 Budget	2023 Actuals	% of Budget Received
January	\$ 6,787,065	\$ 7,560,658	\$ 8,126,107	\$ 7,994,241	\$ 8,177,567	102.29%
February	\$ 6,031,190	\$ 7,296,946	\$ 8,108,303	7,850,776	8,115,984	103.38%
March	\$ 5,934,973	\$ 9,539,643	\$ 9,618,167	9,763,144	9,380,893	96.08%
April	\$ 6,228,837	\$ 8,167,998	\$ 9,280,481	8,892,040	8,587,248	96.57%
May	\$ 7,939,384	\$ 9,243,797	\$ 8,936,817	9,265,148	9,265,148 *	100.00%
June	\$ 8,371,592	\$ 9,587,077	\$ 9,684,670	9,821,208	9,821,208 *	100.00%
July	\$ 8,297,927	\$ 9,206,214	\$ 9,421,412	9,492,953		
August	\$ 7,963,120	\$ 8,885,088	\$ 9,526,356	9,382,783		
September	\$ 8,326,834	\$ 9,264,407	\$ 9,765,463	9,697,943		
October	\$ 8,023,707	\$ 8,786,442	\$ 9,529,305	9,334,014		
November	\$ 7,633,747	\$ 8,736,757	\$ 8,784,403	8,929,080		
December	\$ 9,289,086	\$ 9,739,080	\$ 10,146,049	10,133,798		
Total Sales Tax	\$ 90,827,462	\$ 106,014,106	\$ 110,927,532	\$ 110,557,130	\$ 53,348,047	48.25%



*There is a two-month delay between when the sales tax is collected and remittance to Pierce Transit. The projection is based on the current year's monthly budgeted amount for this report until the remitted amount is finalized.

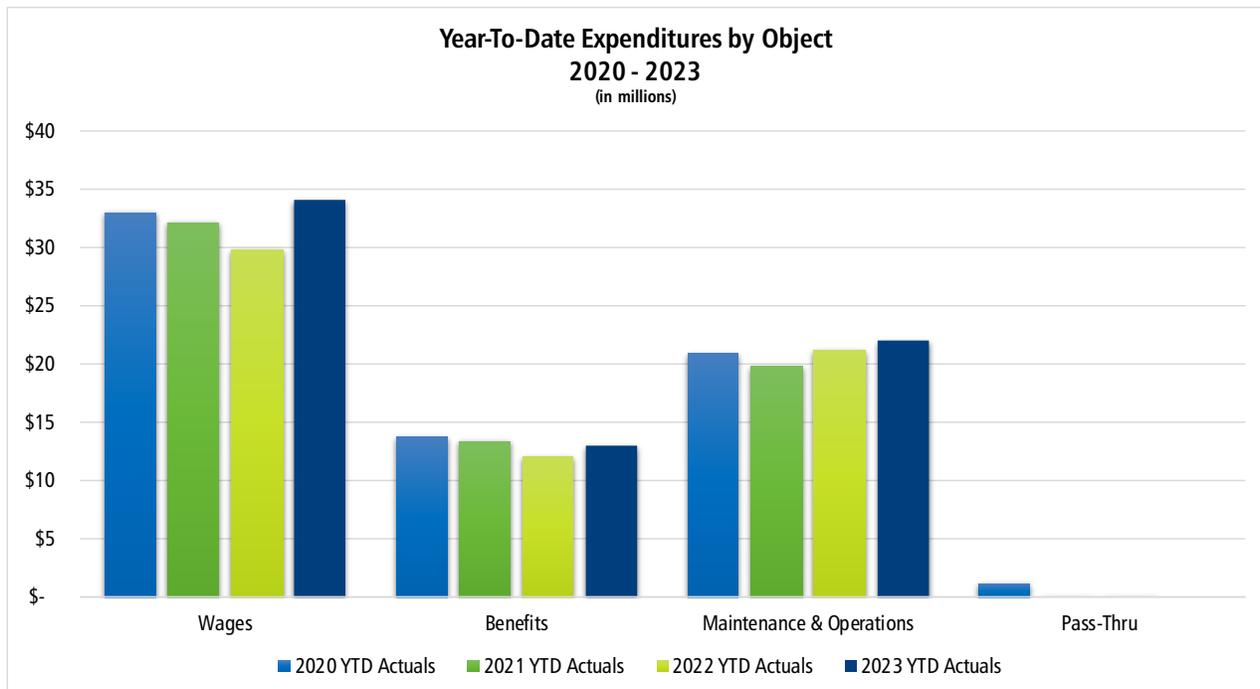
2nd Quarter 2023 collections are 0.76%, or \$406,497 under year-to-date 2022 actuals.

2nd Quarter 2023 collections are 0.45%, or \$238,510 under year-to-date 2023 budget.

Operating Expenditures by Object

As of June 30th, Pierce Transit has expended 42.27% of the budgeted expenditures. A comparison of operating expenditures for three prior years and the 2023 Budget and Actuals are provided in the table below. The 2023 budget numbers are for the full year whereas actuals for each year reflect activity through January 1st through June 30th. Non-Departmental Pass-Thru funds are payments made to Pierce County as part of the 5307 agreements.

	2020	2021	2022	2023		% of Budget Expended
	YTD Actuals	YTD Actuals	YTD Actuals	Budget	YTD Actuals	
Wages	\$ 33,055,674	\$ 32,230,372	\$ 29,866,276	\$ 81,402,050	\$ 34,073,267	41.86%
Benefits	\$ 13,760,724	\$ 13,431,562	\$ 12,027,905	31,237,330	13,073,255	41.85%
Total Personnel	\$ 46,816,398	\$ 45,661,934	\$ 41,894,181	\$ 112,639,380	\$ 47,146,522	41.86%
Maintenance & Operations	\$ 21,006,447	\$ 19,901,320	\$ 21,202,535	\$ 49,970,850	\$ 22,069,069	44.16%
Total Operating Expenditures	\$ 67,822,845	\$ 65,563,254	\$ 63,096,716	\$ 162,610,230	\$ 69,215,591	42.57%
Pass-Thru	\$ 1,143,054	\$ -	\$ -	\$ 1,150,000	\$ -	0.00%
Total Expenditures	\$ 68,965,899	\$ 65,563,254	\$ 63,096,716	\$ 163,760,230	\$ 69,215,591	42.27%



Highlights from 2nd Quarter:

Overall operating expenditures are under budget by 7.73% when compared to 50% of the annual budget. All categories are under budgeted expectations. The main cause is vacant positions in Maintenance and Service Delivery. Our largest expense category is personnel costs, currently 69.3% of the overall expenditures.

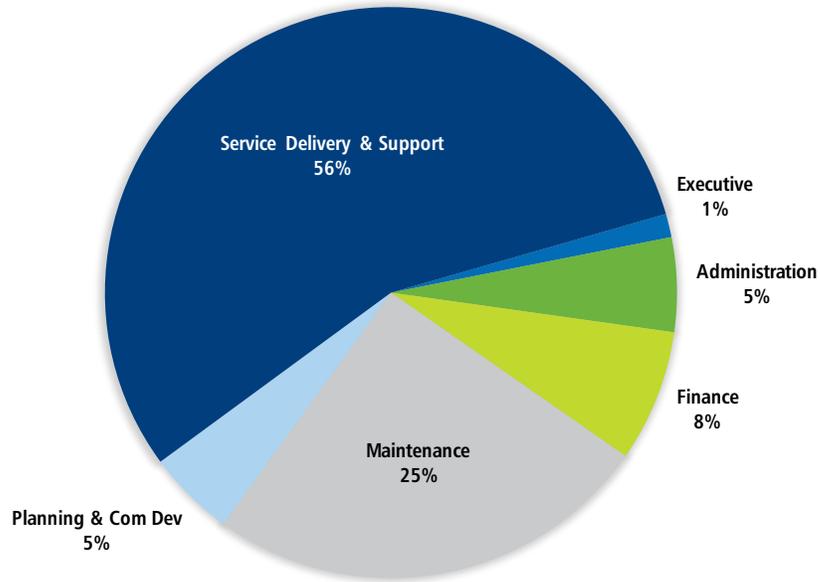
No non-departmental pass-thru payments have been made to Pierce County as part of the 5307 agreements in the first quarter of 2023. Historically payments have been made later in the year.

Operating Expenses by Division

Pierce Transit consists of six divisions: Executive, Administration, Finance, Maintenance, Planning & Community Development, and Service Delivery & Support. Approximately 70% of our budgeted operating expenditures are wages and benefits for personnel. 867 or 88% of our personnel is included in Maintenance and Service Delivery & Support.

	2020	2021	2022	2023		% of Budget Expended
	YTD Actuals	YTD Actuals	YTD Actuals	Budget	YTD Actuals	
Executive	857,856	820,302	822,128	2,065,660	918,471	44.46%
Administration	3,531,898	3,386,688	3,686,847	9,597,520	3,694,692	38.50%
Finance	7,069,155	5,988,756	6,562,720	12,960,020	5,177,202	39.95%
Maintenance	15,970,303	16,420,051	14,958,363	37,020,200	17,493,192	47.25%
Planning & Com Dev	2,953,438	2,953,370	2,976,575	8,208,230	3,420,110	41.67%
Service Delivery & Support	37,440,196	35,994,087	34,090,083	92,758,600	38,511,923	41.52%
Subtotal Operating Expenditures	67,822,845	65,563,254	63,096,716	162,610,230	69,215,591	42.57%

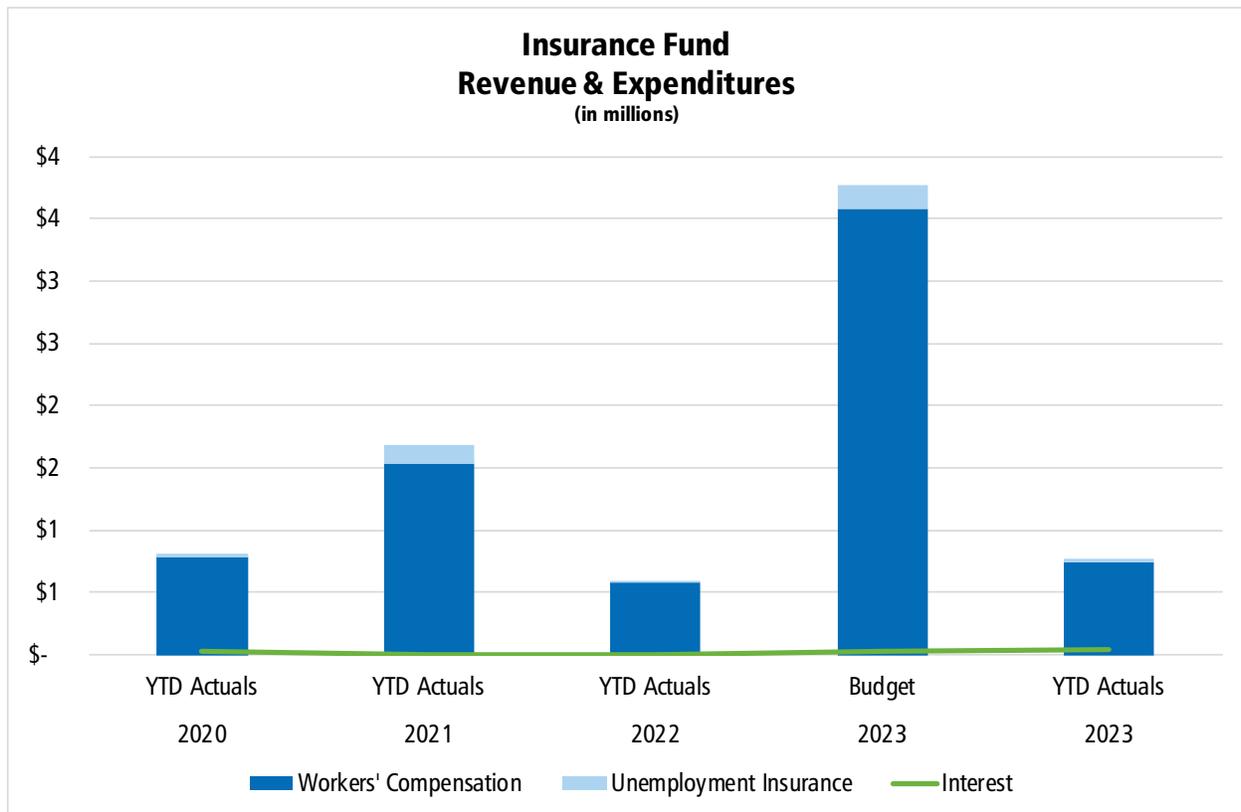
OPERATING EXPENDITURES BY DIVISION 2023



Insurance Budget

Pierce Transit's Insurance Fund covers the expenses for Worker's Compensation and Unemployment Insurance. This fund receives minimal revenues from interest. Expenditures over revenue are covered using reserves and transfers from the Operating Fund.

	2020	2021	2022	2023	2023	
	YTD Actuals	YTD Actuals	YTD Actuals	Budget	YTD Actuals	% of Budget
Revenue						
Interest	\$ 24,703	\$ 2,451	\$ 6,081	\$ 25,000	\$ 47,829	191.32%
Expenditures						
Workers' Compensation	\$ 792,231	\$ 1,529,405	\$ 575,587	\$ 3,575,710	\$ 741,148	20.73%
Unemployment Insurance	19,035	162,372	17,301	200,000	30,299	15.15%
	\$ 811,265	\$ 1,691,777	\$ 592,888	\$ 3,775,710	\$ 771,447	20.43%
Net Income (Loss)	\$ (786,562)	\$ (1,689,326)	\$ (586,807)	\$ (3,750,710)	\$ (723,618)	

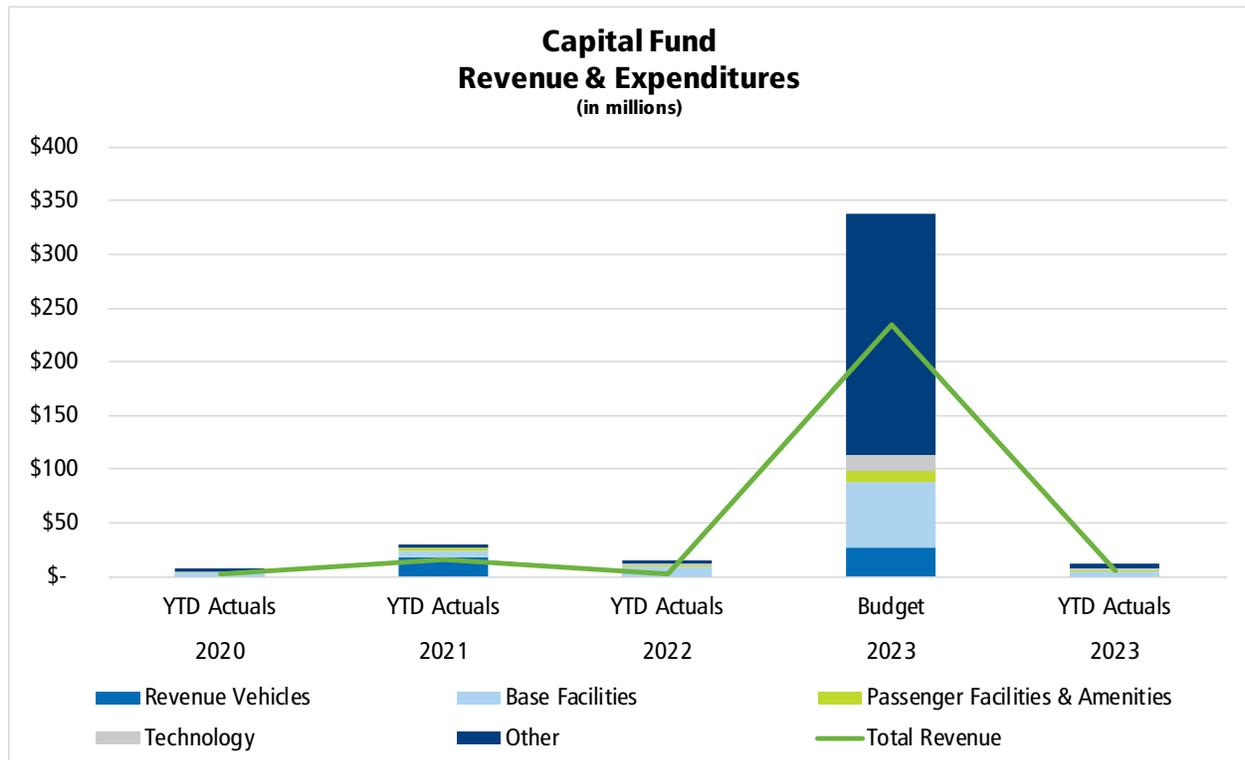


Capital Budget

Capital Fund is designated to provide funding and budgets for projects that meet the guidelines of capital, broadly defined as greater than \$5,000, or aggregate purchases over \$50,000, and useful life of more than one year. Capital projects are budgeted for the full amount in the year that they are added to the capital portfolio. Any unspent budgets are carried forward to the next budget year along with any remaining funding. Funding for projects is received from Federal, State, and other sources and is project specific. Expenditures over revenue are covered using reserves and transfers from the Operating Fund. Classifications of capital expenditures are defined by the National Transit Database (NTD).

	2020 YTD Actuals	2021 YTD Actuals	2022 YTD Actuals	2023 Budget	2023 YTD Actuals
Revenue					
Interest	\$ 312,171	\$ 29,831	\$ 107,235	\$ 175,000	\$ 879,623
Grants	1,702,836	15,103,613	2,079,505	234,631,590	4,101,854
Total Revenue	\$ 2,015,007	\$ 15,133,444	\$ 2,186,740	\$ 234,806,590	\$ 4,981,477
Expenditures					
Revenue Vehicles	\$ 8,126	\$ 17,395,039	\$ 10,000	\$ 26,452,730	\$ 252,937
Base Facilities	3,238,604	6,352,000	8,915,122	61,899,580	4,839,621
Passenger Facilities & Amenities	549,217	2,686,320	1,072,044	9,831,360	1,353,092
Technology	1,425,805	819,485	1,904,109	15,595,150	1,343,484
Other	2,022,017	3,347,002	2,682,831	223,540,660	4,366,932
Total Expenditures	\$ 7,243,769	\$ 30,599,846	\$ 14,584,106	\$ 337,319,480	\$ 12,156,066
Net Income (Loss)	\$ (5,228,762)	\$ (15,466,402)	\$ (12,397,365)	\$ (102,512,890)	\$ (7,174,589)

% Covered by Outside Funding 23.51% 49.36% 14.26% 69.56% 33.74%



Transfers

Transfers made from the Operating Fund to the Insurance and Capital Funds are to cover reserve requirements and expenditures. Transfers out from the Operating Fund and into the Insurance and Capital Funds net to zero and are not considered an actual revenue or expenditure in any fund. Below is a historical view of transfers made between funds.

	2020 Actuals	2021 Actual	2022 Actual	2023 Budget	2023 Actual	% of Budget
Operating Fund	(22,189,135)	(20,647,692)	(61,510,479)	(61,383,510)	(5,835,100)	9.51%
Insurance Fund	2,758,476	334,904	2,098,101	5,835,100	5,835,100	100.00%
Capital Fund	19,430,659	20,312,788	59,412,378	55,548,410	-	0.00%

Balances

Ending balances include the required reserves for the operating, insurance, and capital funds. The Board of Commissioner's reserve policy supports management decision-making by avoiding revenue-expenditure imbalances, supporting stable service delivery, and assuring funds are available for operations, self-insurance programs, and planned capital acquisition during economic downturns or other unanticipated events.

	Operating	Insurance	Capital
Beginning Balance	\$ 123,185,702	\$ 1,071,299	\$ 87,148,759
Revenue	\$ 98,354,887	47,829	4,981,477
Transfers-In	\$ -	\$ 5,835,100	\$ -
	<u>\$ 98,354,887</u>	<u>\$ 5,882,929</u>	<u>\$ 4,981,477</u>
Expenditures	\$ 69,215,591	771,447	12,156,066
Transfers-Out	\$ 5,835,100	\$ -	\$ -
	<u>\$ 75,050,691</u>	<u>\$ 771,447</u>	<u>\$ 12,156,066</u>
Ending Balance	<u>\$ 146,489,898</u>	<u>\$ 6,182,781</u>	<u>\$ 79,974,170</u>
Required Reserve	\$ 27,101,710	\$ 1,200,000	\$ 8,500,000
Margin (Deficit)	\$ 119,388,188	\$ 4,982,781	\$ 71,474,170

Reserve Requirements

Operating: A minimum of two months of agency operating expenditures of the current year and is currently \$27.1 million.

Insurance: An adequate level to protect the agency from self-insurance risk. The level is reviewed periodically and is currently \$1.2 million.

Capital: A minimum of 50% of the previous three years average of annual asset depreciation at any point in the Six-Year Financial Plan; 100% in the final year of the Six-Year Financial Plan and is currently \$8.5 million each year and \$17.0 million in the final year.

Budget Revisions & Amendments

Budget revisions are done when the approved budget moves from one account to another. Revisions do not have a financial impact on the agency budget. Budget revisions do require the Board of Commissioners' approval when capital projects are increased by \$50,000 or more cumulatively over the life of the project.

Budget amendments occur when unforeseen expenses are expected, and the agency budget is increased. Budget amendments require Board of Commissioner approval. Below is a list of changes made to the budget in the 2nd quarter of 2023 and a table showing the new fund balances caused by the changes.

Fund	Item Description	Quarter	Beginning Fund Balance						Ending Fund Balance		Fact Sheet or Resolution #	
			Revenues	Transfers-In	Sources	Expenditures	Transfers-Out	Uses				
Operating												
	Beginning Fund Balance Adjustment from Estimate to Actual	1	16,842,344			-				-	16,842,344	N/A
			16,842,344	-	-	-	-	-	-	-	16,842,344	
Insurance												
	Beginning Fund Balance Adjustment from Estimate to Actual	1	1,955,691			-				-	1,955,691	N/A
			1,955,691	-	-	-	-	-	-	-	1,955,691	
Capital												
	Beginning Fund Balance Adjustment from Estimate to Actual	1	31,684,280			-				-	31,684,280	N/A
			31,684,280	-	-	-	-	-	-	-	31,684,280	
	Grand Total		50,482,315	-	-	-	-	-	-	-	50,482,315	

Budget Revision & Amendment Highlights:

2023 Beginning balances were up \$50,482,315 compared to budget due to underspending the budgeted 2022 year-end estimates agency wide.

Projects Closed this Quarter

Project Number & Name	Budget	Actual
345 – Building 4 Modifications	\$4,255,022	\$4,139,979
602 – Bus Fleet Replacement 2021	\$6,209,100	\$5,707,207
613 – BRT System Expansion Study	\$837,303	\$805,787
616 – 2021 Ford Explorer (Vanpool Replacement)	\$32,310	\$29,523
618 – Building 4 Lobby Hardening	\$150,523	\$125,589
630 – Body Shop Storage Cabinets (cancelled)	\$28,365	\$0
634 – Building 1 Pit Jack	\$19,690	\$15,210



Sustainability Report 2022

Executive Finance Committee Presentation

July 20, 2023

Pamela Gant, MS | Data Analyst

pgant@piercetransit.org

2022 Overview

- Data has been collected from a variety of sources since 2017 and is modeled by the Data Analytics team
- The Sustainability Report 2022 includes Scope 1 (direct) and Scope 2 (purchased energy) emissions for Pierce Transit directly operated or directly purchased transportation (*excludes Sound Transit*)
- This data can be shared with partners and stakeholders to contribute to regional emissions data and emission reduction projects
- Select data is shared on the Pierce Transit Sustainability webpage and submitted to APTA’s Sustainability Commitment team annually

Measure	2022 Value	Percent change from 2021
Total CO2 Emissions	12,834 metric tons	-2.35%
Fleet CO2 Emissions	12,373 metric tons	-1.80%
Facilities CO2 Emissions	461 metric tons	-14.98%
Criteria Air Pollutants	124.65 metric tons	+8.67%
CO2 per 10,000 VMT	11.78 metric tons	-7.02%
CO2 per VMT	2.59 pounds	-7.02%
CO2 per PMT	0.82 pounds	-16.08%
CO2 per Revenue Hour	46.48 pounds	-3.25%
Gasoline displaced by public transit	825,542 gallons	+33.42%
CO2 Savings	7,273 metric tons	+33.42%
CO2 Savings per 10,000 VMT	6.68 metric tons	+27.03%
Water use	12,222,306 gallons	+5.43%
Garbage and recycling	2,790,773 pounds	+5.43%
Recycling Ratio	74%	
Electricity use	6,391,842 kwh	+10.38%
Gas use	64,643 therms	-20.43%

Data collection

- Data is collected from a variety of sources including fuel usage, utilities usage, passenger mileage and ridership, etc.
- Data is imported to the Data Warehouse
- Data is cleaned and added to a data model created by Data Analytics Department
- **Power BI report** is available for ongoing tracking and all annual sustainability measures (internal only)

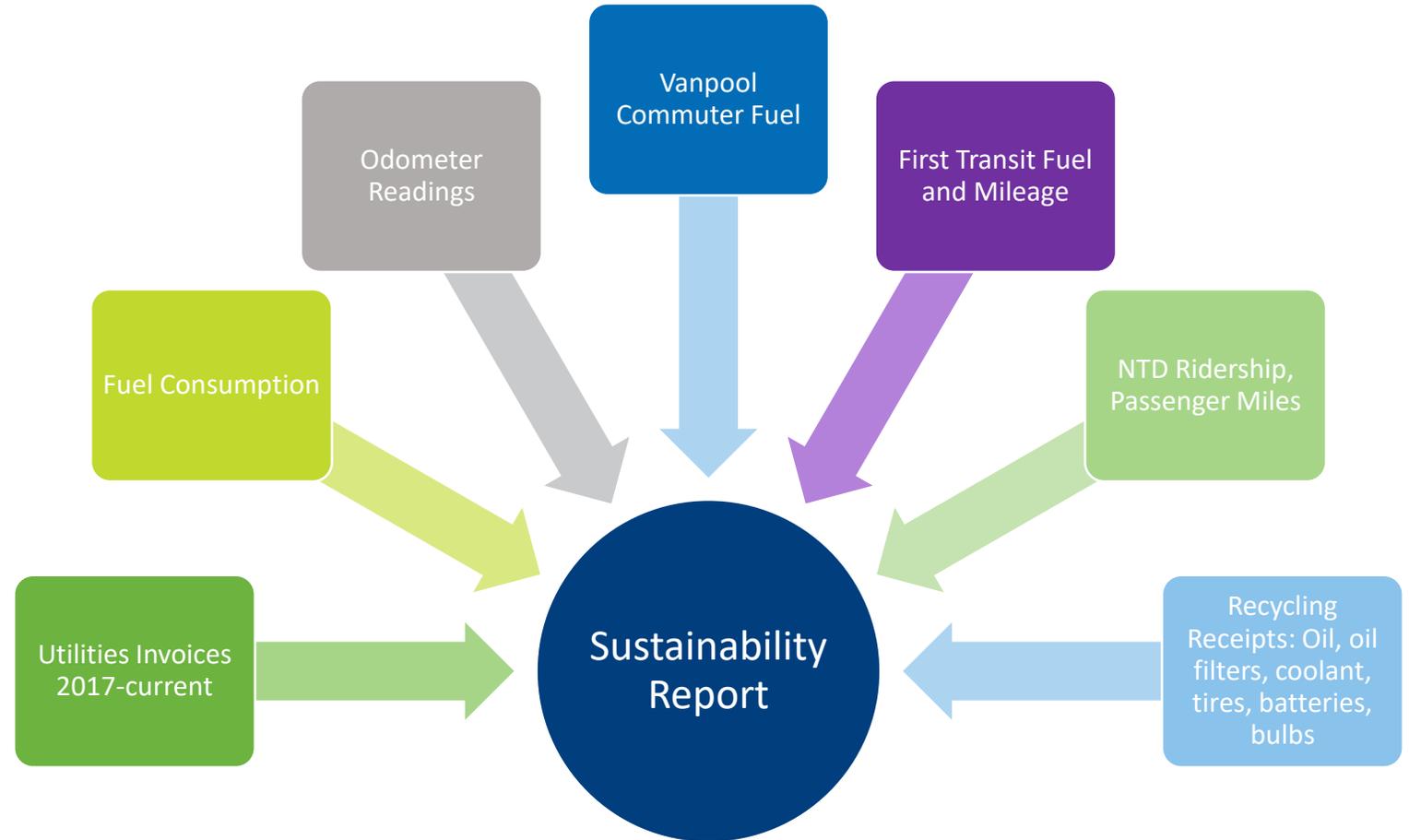
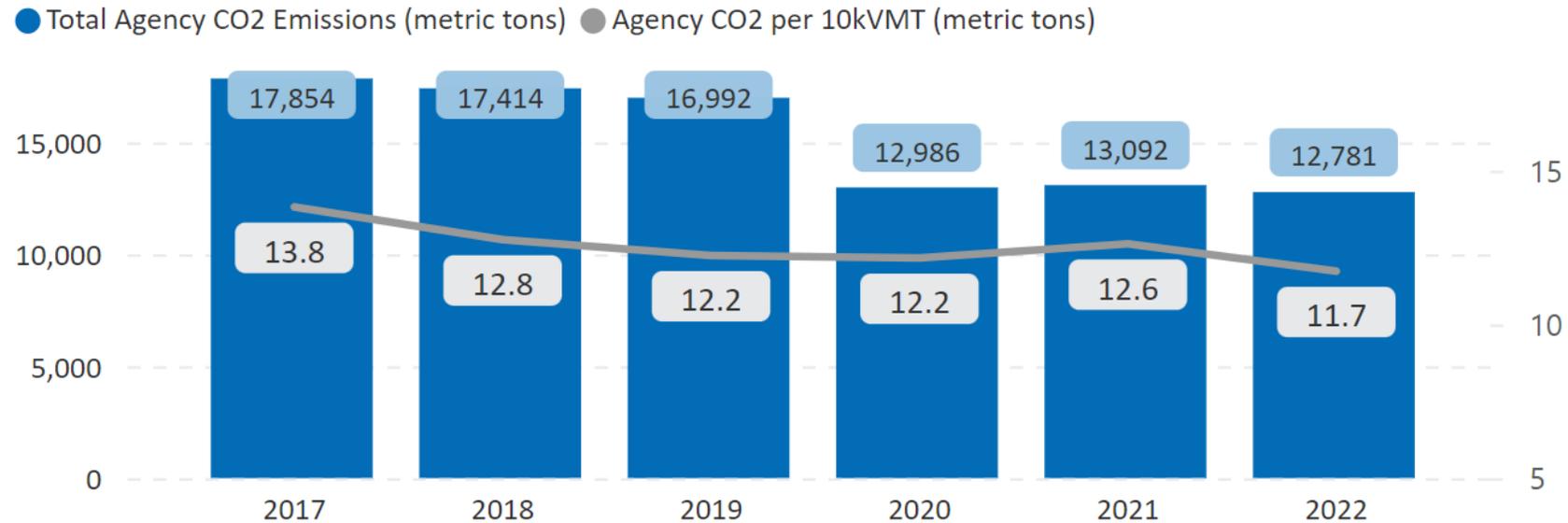


Figure 1. Data collected for Pierce Transit’s Sustainability Report 2022

Carbon footprint

What are Pierce Transit's carbon emissions each year?

Greenhouse gas emissions are calculated as the total metric tons of CO2 produced through electricity, natural gas, compressed natural gas (CNG), unleaded fuel, and diesel fuel. Emissions are normalized by metric tons per 10,000 vehicle miles traveled.



Source: Pierce Transit Sustainability Report (2022)

Figure 2. Pierce Transit total agency annual CO2 emissions

- The agency saw a **2%** decrease in total emissions from 2021
- The agency saw a **7%** decrease in normalized emissions (per vehicle mile) from 2021

Pierce Transit CO2 emissions mix 2022

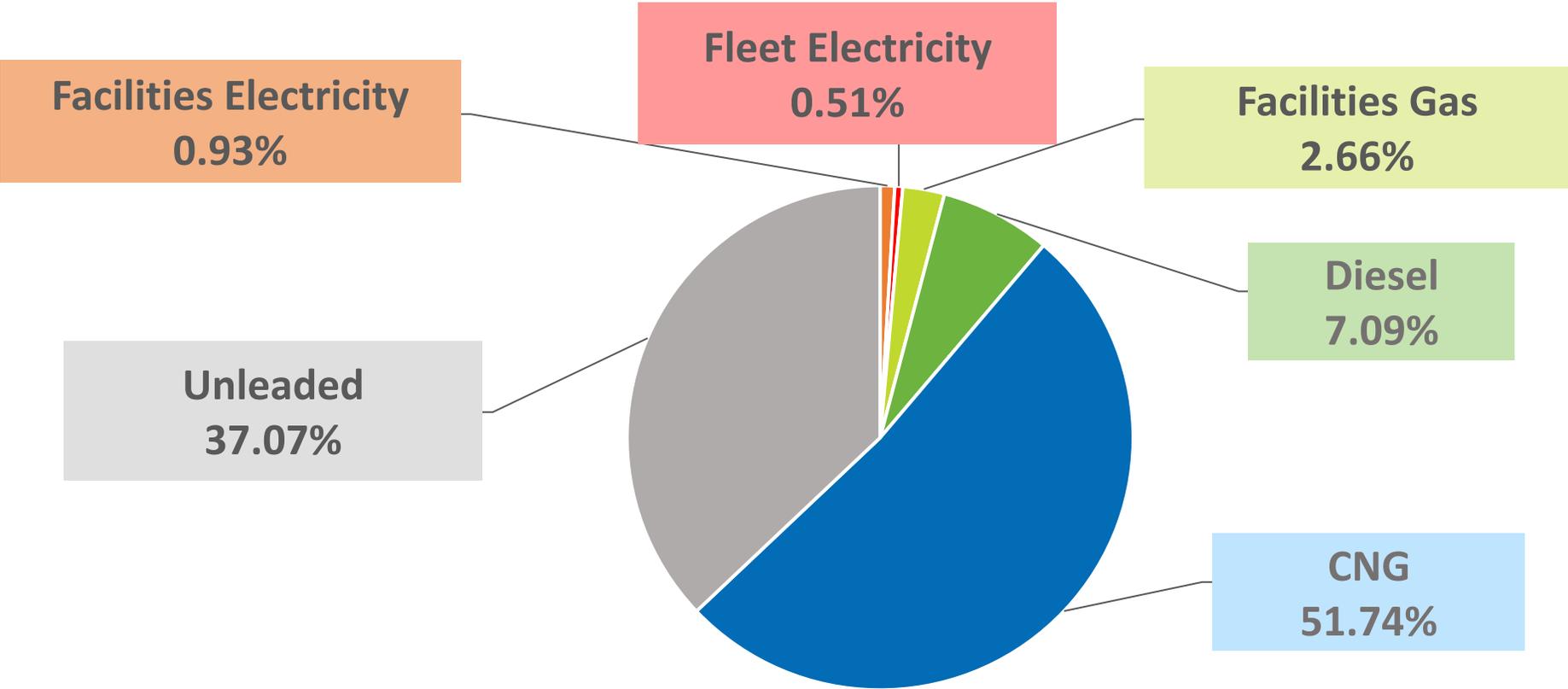


Figure 3. Pierce Transit total agency CO2 emissions sources

Fleet greenhouse gas emissions

- The fleet produces **96%** of total agency emissions annually
- In 2022 the fleet produced **12,373 metric tons of CO2** and **125 metric tons of criteria air pollutants (CAP)**, a **2% decrease from 2021**
- To compare fleet emissions, CO2 and CAP emissions are **normalized per vehicle mile traveled (VMT)**
- CNG bus CO2 per VMT includes the Scope 2 emissions from the electricity required to pump the CNG

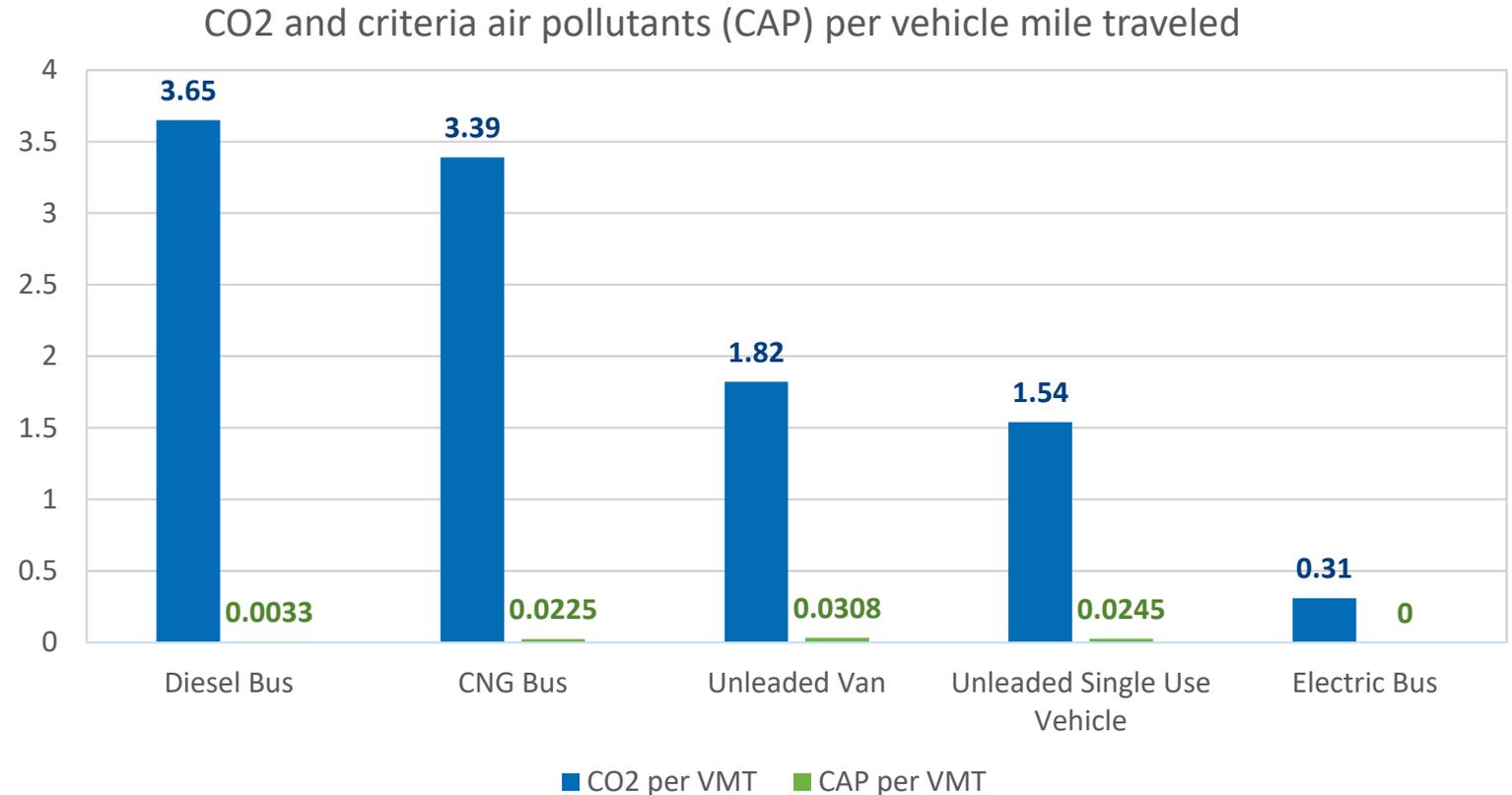


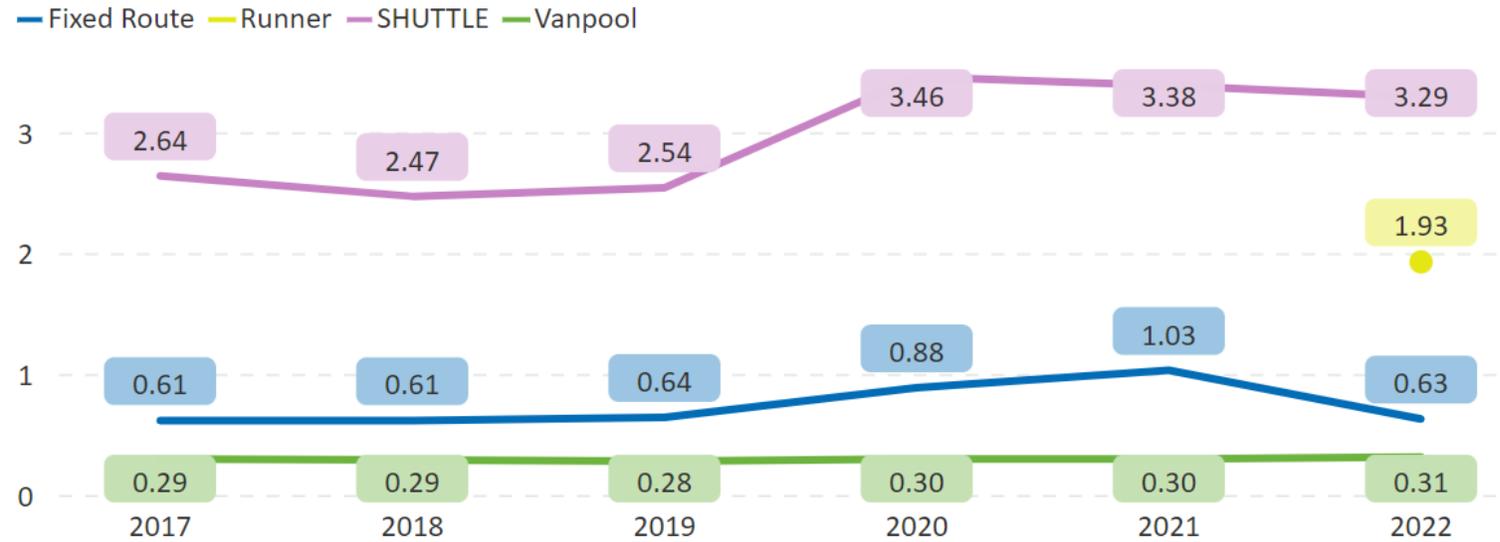
Figure 4. CO2 and CAP per VMT by vehicle and fuel type, 2022

CO2 emissions by transit mode

- Across all modes of transit in 2022, Pierce Transit emitted **0.72 pounds of CO2 per passenger mile traveled (PMT)**, a **27% decrease from 2021**

How much CO2 is produced per passenger mile traveled?

A published FTA report in 2011 shows a personal commuter vehicle emits 0.96 lbs of CO2 per passenger mile.



Source: Pierce Transit Sustainability Report (2022)

Figure 5. CO2 per passenger mile traveled by transit mode

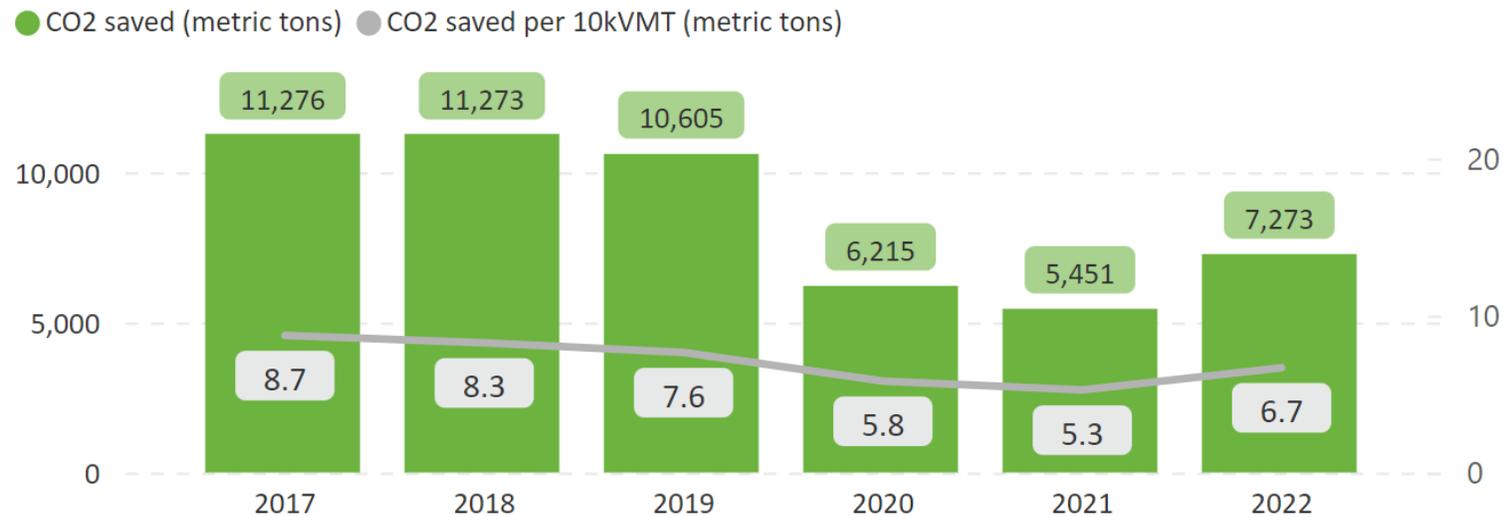
Transit Mode	National Average
Fixed Route	0.64 pounds of CO2 per PMT
Demand Response (SHUTTLE)	3.10 pounds of CO2 per PMT
Vanpool	0.22 pounds of CO2 per PMT

Greenhouse gas savings

- Using a *mode-shift factor* (a ratio of car miles displaced by public transit miles) and an average MPG for local vehicles we can estimate the gallons of gasoline displaced by public transit:
825,542 gallons saved in 2022! A 33% increase from 2021!

What are Pierce Transit's carbon savings each year?

Greenhouse gas savings are calculated as the total metric tons of CO2 saved by utilizing a public transit system instead of a personal commuter vehicle. Savings are normalized by metric tons per 10,000 vehicle miles traveled.



Source: Pierce Transit Sustainability Report (2022)

Figure 6. CO2 saved through mode-shift annually

CO2 savings by transit mode

- By displacing personal vehicle miles to public transit miles, across all transit modes Pierce Transit saved **1.47 pounds of CO2 per VMT** in 2022, a 27% increase from 2021!

CO2 savings (pounds) per vehicle mile, by mode

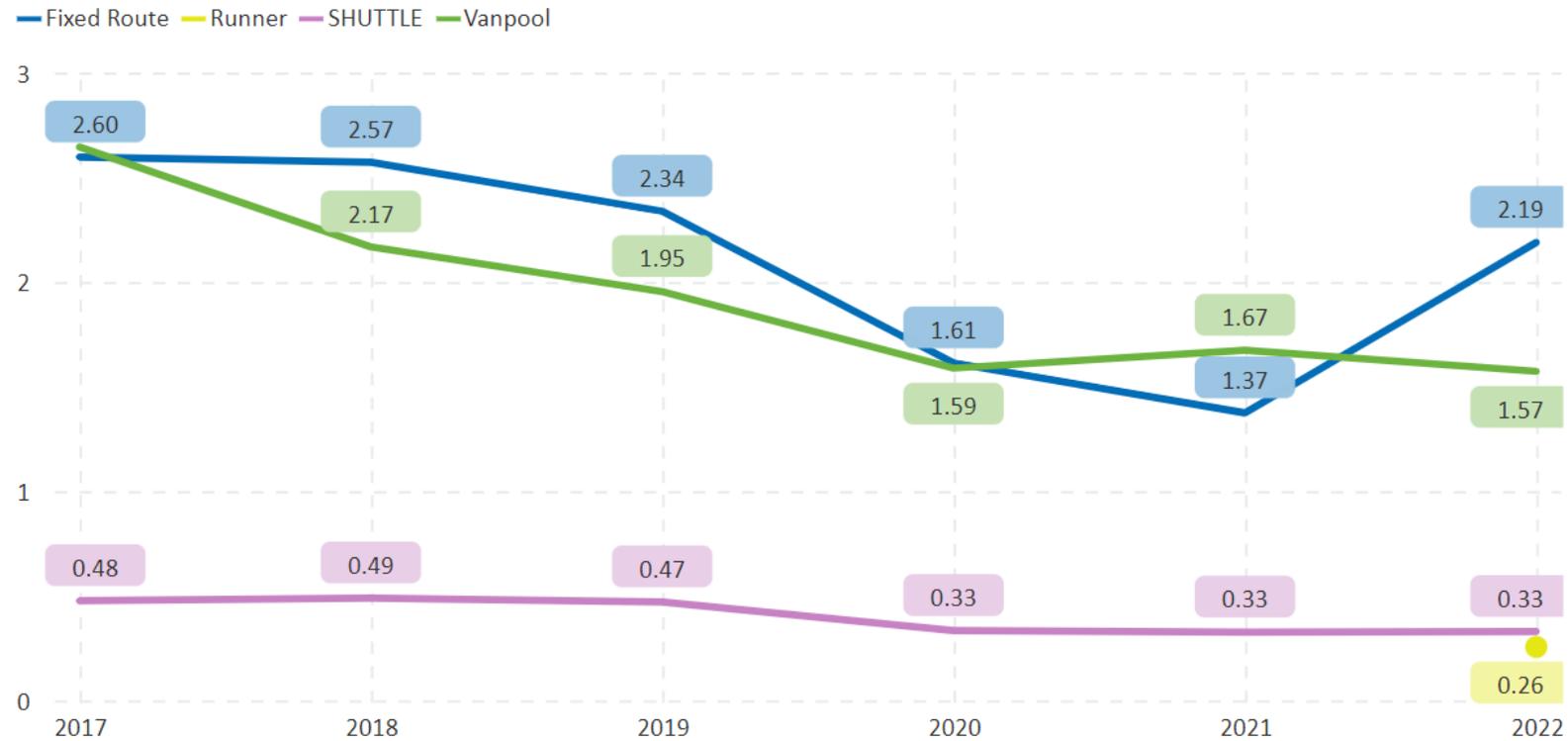


Figure 7. CO2 saved per vehicle traveled by transit mode

Annual electricity consumption

- In 2022 there was a 10% increase in electricity consumption
- Facilities accounted for 65% of total electricity use, CNG pump stations 29%, and electric bus charging 6%

Electricity use (kwh) by year

● Facilities Electricity kwh ● CNG Pump Stations kwh ● Electric bus kwh

**2022 rate:
\$0.1034/kwh**

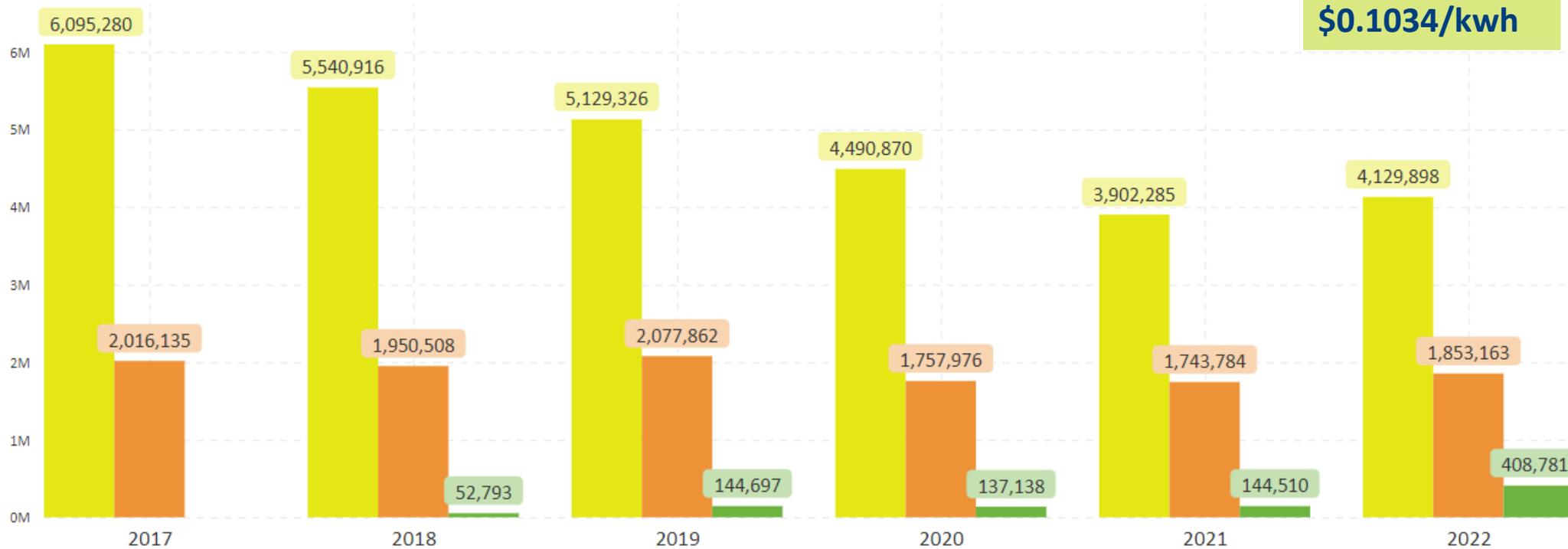
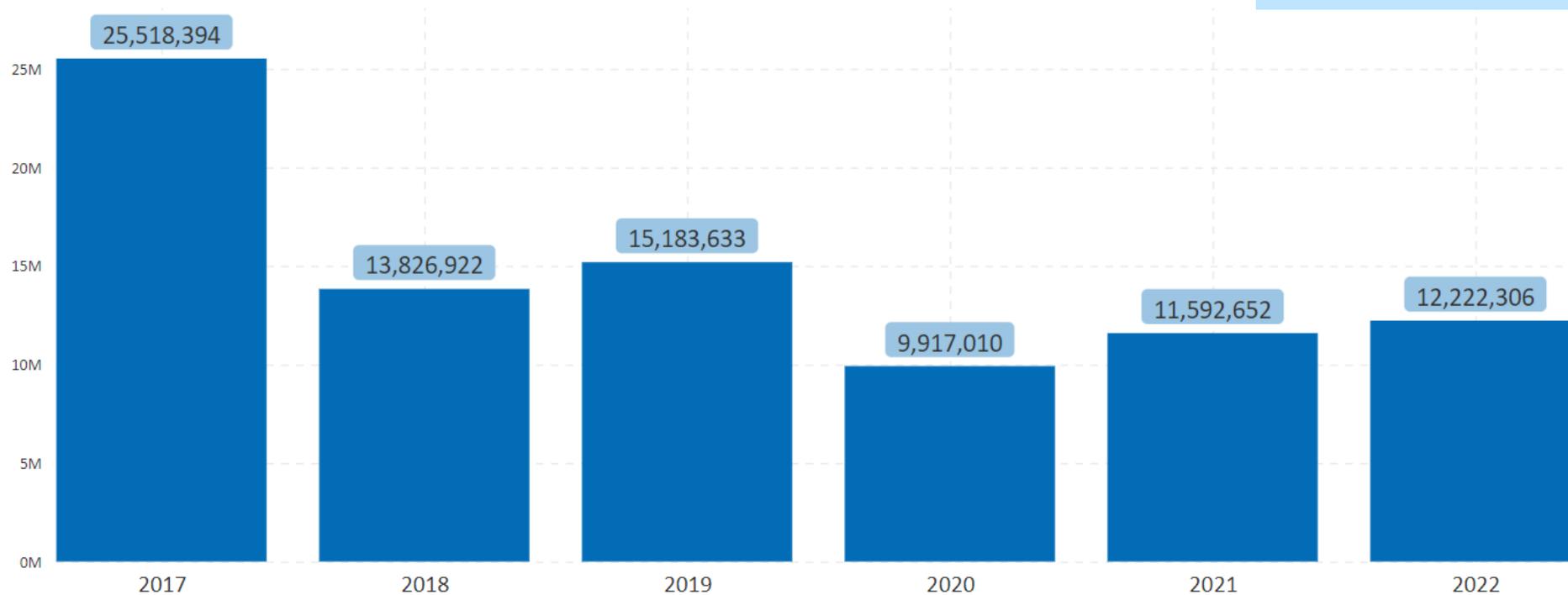


Figure 8. Annual electricity consumption

Annual water consumption

- In 2022 there was a 5% increase in water use

Water use (gallons) by year



2022 rate:
\$0.0145/gallon

Figure 9. Annual water consumption

Annual garbage and recycling

- In 2022 there was a **5% increase in total waste production**
- More tires and bus batteries were recycled in 2022 than 2021
- Less garbage went to the dump in 2022
- **Recycling includes:**
 - Shredded paper
 - Oil
 - Oil filters
 - Tires
 - Batteries
 - Coolant
 - Facilities recycling

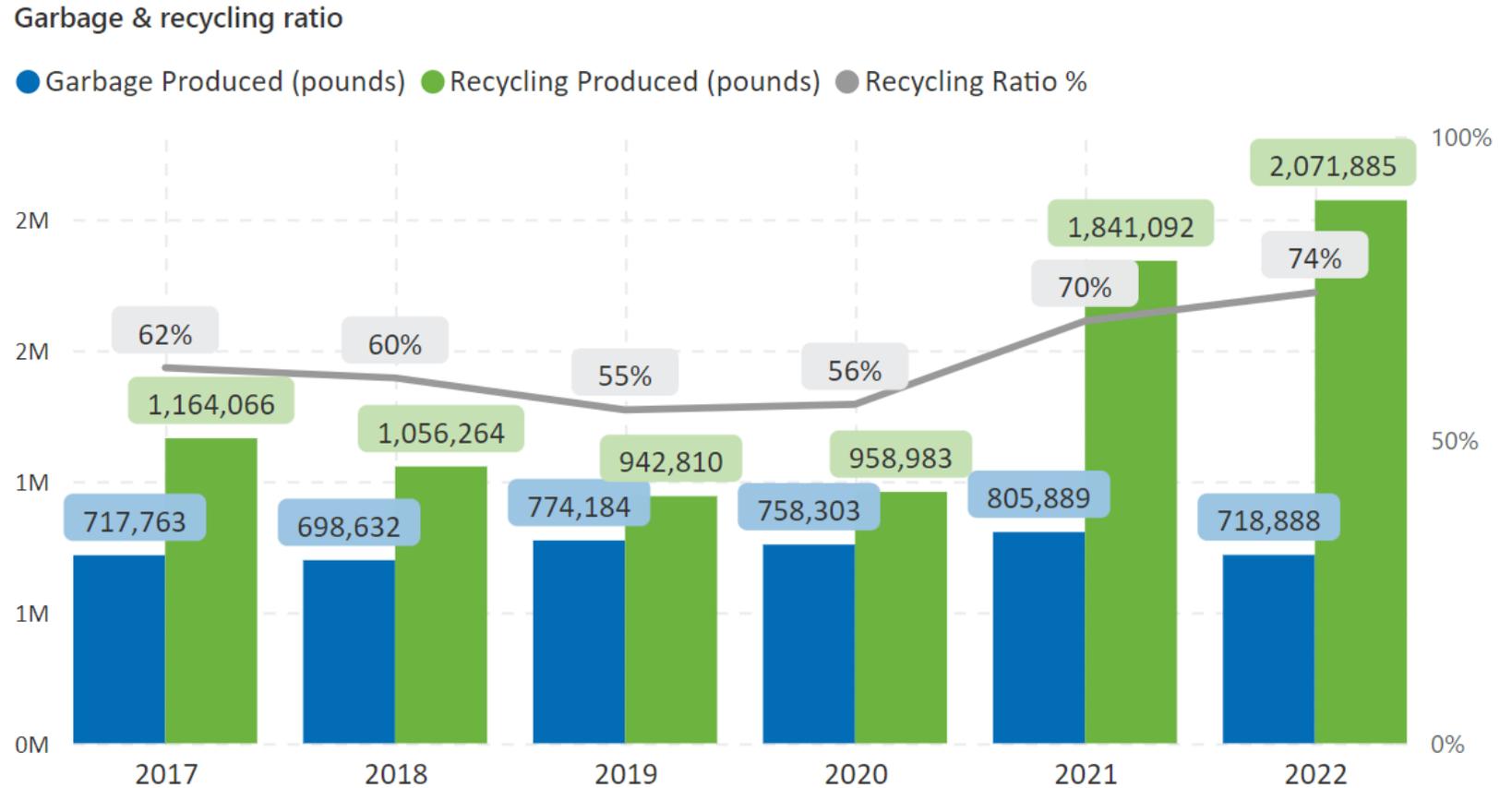


Figure 10. Annual garbage and recycling

2022 Utilities & fuel cost

- In 2022, Pierce Transit **spent approximately \$3.6 million on utilities and fuel**, a 23% increase from the previous year (this subtracts an estimated fuel cost for the Sound Transit fleet). Fuel costs include delivery charges.

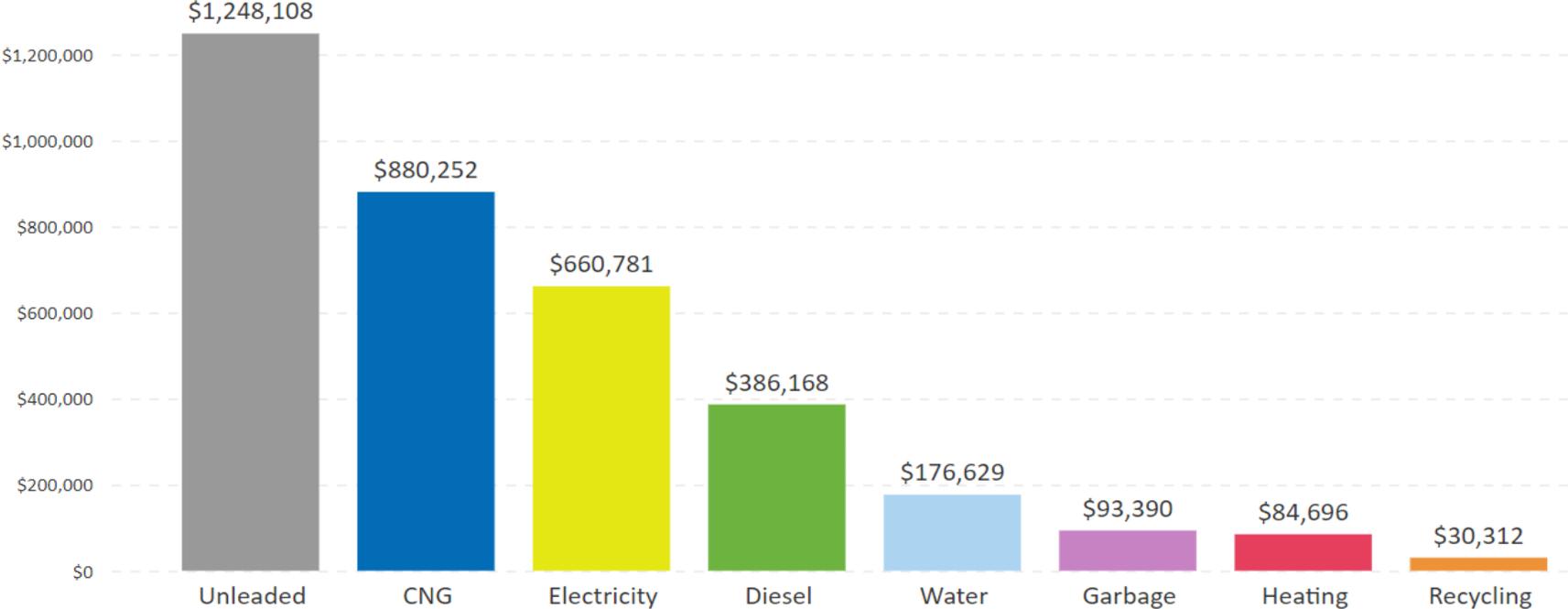


Figure 11. Pierce Transit utilities and fuel costs in 2022

Estimated annual fuel cost efficiencies

- The cost of fuel fluctuates throughout the year
- Costs include fuel delivery charges
- A separate data model examining fuel cost per mile shows similar estimates for the Pierce Transit fleet

Cost per vehicle mile, by fuel type

● CNG ● Diesel ● Electricity ● Unleaded

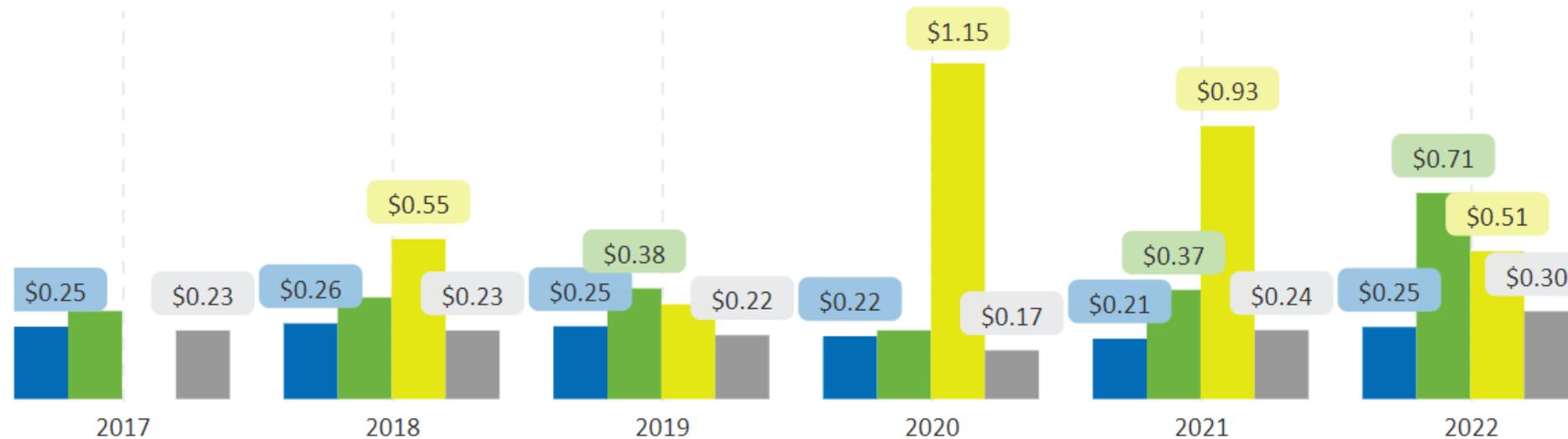


Figure 12. Annual fuel cost per vehicle mile, by fuel type

Pierce Transit Sustainability Report 2022

Pamela Gant, MS
Data Analyst
pgant@piercetransit.org

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2022 Summary

Sustainable transit reduces a community's environmental footprint from transportation and enhances its quality of life by making travel more enjoyable, affordable and timely. At Pierce Transit sustainability is a core value, addressed in terms of both the services we provide and how we operate.

This report was prepared by the Pierce Transit Data Analytics team to provide a clear picture of our agency utilities and emissions data from multiple sources.

Key Emissions & Sustainability Data Points 2022

Measure	2022 Value	Percent change from 2021
Total CO2 Emissions	12,834 metric tons	-2.35%
Fleet CO2 Emissions	12,373 metric tons	-1.80%
Facilities CO2 Emissions	461 metric tons	-14.98%
Criteria Air Pollutants	124.65 metric tons	+8.67%
CO2 per 10,000 VMT	11.78 metric tons	-7.02%
CO2 per VMT	2.59 pounds	-7.02%
CO2 per PMT	0.82 pounds	-16.08%
CO2 per Revenue Hour	46.48 pounds	-3.25%
Gasoline displaced by public transit	825,542 gallons	+33.42%
CO2 Savings	7,273 metric tons	+33.42%
CO2 Savings per 10,000 VMT	6.68 metric tons	+27.03%
Water use	12,222,306 gallons	+5.43%
Garbage and recycling	2,790,773 pounds	+5.43%
Recycling Ratio	74%	
Electricity use	6,391,842 kwh	+10.38%
Gas use	64,463 therms	-20.43%

Methodology

Data collection

The Data Analytics team reviews the following data sources and enters them in a tracking tool on a monthly, quarterly, or annual basis:

- Utilities invoices for electricity, gas, water, garbage, and recycling;
- Fuel consumption reports;
- Vehicle mileage reports;
- Vanpool commuter fuel receipts;
- Contracted paratransit fuel consumption;
- NTD ridership and passenger mileage reports;
- Tire, oil, coolant, lightbulb, and battery recycling receipts

Greenhouse gas inventory

The greenhouse gas emissions in this report are calculated by analyzing Scope 1 and Scope 2 emissions as outlined by the American Public Transit Association’s (APTA) *Quantifying Greenhouse Gas Emissions from Transit*.

- **Scope 1** emissions include direct operational emissions from mobile combustion (e.g., fleet fuel for revenue and non-revenue vehicles) and stationary combustion (e.g., gas used for heating facilities).
- **Scope 2** emissions include indirect operational emissions from purchased energy (e.g., electricity use).
- **Scope 3** emissions are not explored in this report and may be explored in the future.

Conversions

To calculate emissions from various energy sources, the following conversions are used:

- **Electricity:** 0.063317 lbs. CO₂e/kwh (determined by a Power Mix analysis gleaned from utility providers)
- **CO₂ emissions** are calculated using data available on the EPA’s Greenhouse Gases Equivalencies Calculator
 - **Unleaded:** 0.00878 metric tons CO₂e/gallon
 - **Diesel:** 0.01021 metric tons CO₂e/gallon
 - **Compressed natural gas (CNG):** 0.0061 metric tons CO₂e/gallon equivalent
 - **Natural gas (heating):** 0.0053 metric tons CO₂e/therm
- **Criteria air pollutants** are calculated using APTA vehicle categories and fuel type (see *Appendix A*)
 - Carbon monoxide, Nitrogen oxides, Nonmethane Hydrocarbons, Sulfur oxides, Particulate Matter

Organizational boundary

Pierce Transit’s emissions report includes modes of transit in which the agency has full operational control, including directly operated fixed route service (MBDO), Vanpool (VPDO), and paratransit (DRDO), as well as directly-purchased paratransit service (DRPT). This report does not include emissions data from contracted service provided for regional partner Sound Transit. In this report DRDO and DRPT are aggregated into one mode: SHUTTLE.

Ridership, Passenger Miles, Vehicle Miles, Revenue Hours

Many emissions measures are normalized by boardings, passenger miles, or vehicle miles to reflect changes in operational and/or fuel efficiency. Boardings and passenger miles reflect NTD reported totals, whereas vehicle miles are calculated by actual odometer readings (not service miles).

Table 1. Boardings, passenger miles, vehicle miles, revenue hours in 2022

Mode	Boardings	Passenger Miles	Vehicle Miles	Revenue Hours
Fixed Route	4,946,334	26,436,977	4,916,789	374,687
SHUTTLE	209,416	1,660,198	2,053,907	121,446
Vanpool	382,751	11,193,468	2,898,034	85,984
Runner	5,620	20,861	33,277	2,581
Total	5,544,121	39,311,504	9,902,007	584,698

Greenhouse gas emissions

Total Agency CO2 Emissions

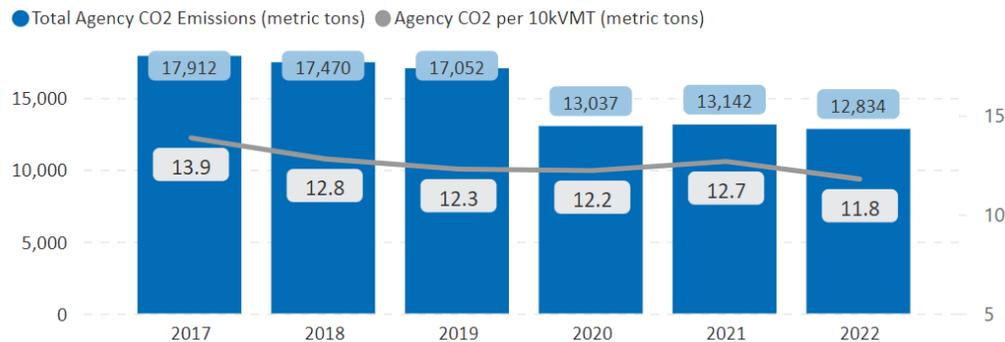
CO2 Emissions

In 2022, Pierce Transit produced **12,834 metric tons of CO2**, a 2.35% decrease from the previous year.

Normalized CO2 Emissions

Normalizing this value by vehicle miles demonstrates vehicle efficiencies year over year. The normalized value in 2022 is **11.8 metric tons of CO2 per 10,000 vehicle miles traveled**, a 7% decrease from the previous year.

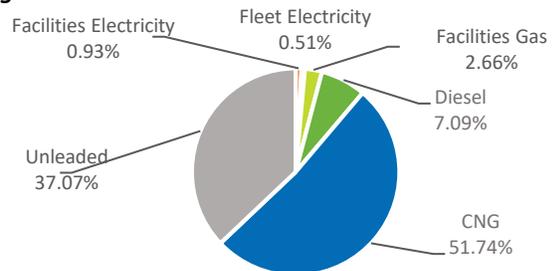
Figure 1. Pierce Transit CO2 emissions and normalized emissions



The COVID-19 pandemic resulted in a significant reduction in overall emissions 2020-2021 as Pierce Transit buses and Vanpools traveled less mileage with fewer passengers than pre-pandemic levels. However, in 2022 we see a 14% increase in ridership and a drastic reduction in normalized emissions, demonstrating better service efficiency per vehicle mile, revenue hour, and passenger mile.

Fleet fuel emissions make up 96% of agency emissions. *Figure 2* presents the breakdown of Pierce Transit's CO2 emissions mix.

Figure 2. Pierce Transit CO2 emissions mix in 2022

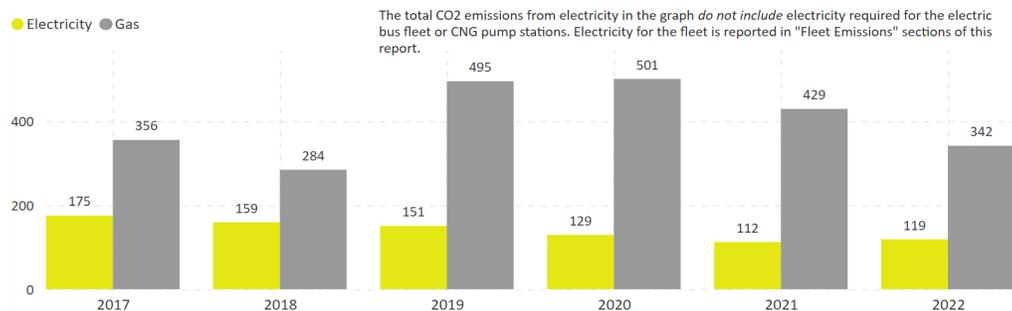


Facilities CO2 Emissions

Pierce Transit's facilities make up nearly 4% of total agency CO2 emissions each year.

In 2022, agency facilities produced **461 total metric tons of CO2**.

Figure 3. Metric tons of CO2 produced from facilities



Fleet CO2 and Criteria Air Pollutant Emissions

Fleet CO2 emissions

In 2022 Pierce Transit's fleet produced **12,373 metric tons of CO2**, a 1.8% decrease from the previous year. Fleet emissions primarily include mobile combustion from diesel, CNG, and unleaded fuel. Fleet emissions also includes electricity used by CNG pump stations and electric buses, which contributes only 0.53% of total fleet CO2 emissions (see *Figure 4*).

Figure 4. Total fleet CO2 by fuel type in 2022

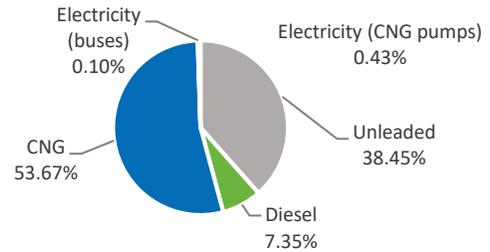


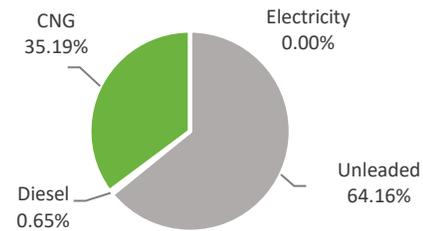
Figure 5. Total fleet CO2 emissions (metric tons) by fuel type



Fleet criteria air pollutant (CAP) emissions

In 2022, Pierce Transit's fleet emitted **125 metric tons of criteria air pollutants (CAP)** (carbon monoxide, nitrogen oxides, nonmethane hydrocarbons, particulate matter, and sulfur oxides), an increase of 8.7% from the previous year. Regional electricity providers generate most electricity through hydroelectric, which produces little to no CAP; for this report, electricity does not produce CAP. Future reports may include CAP for electricity use.

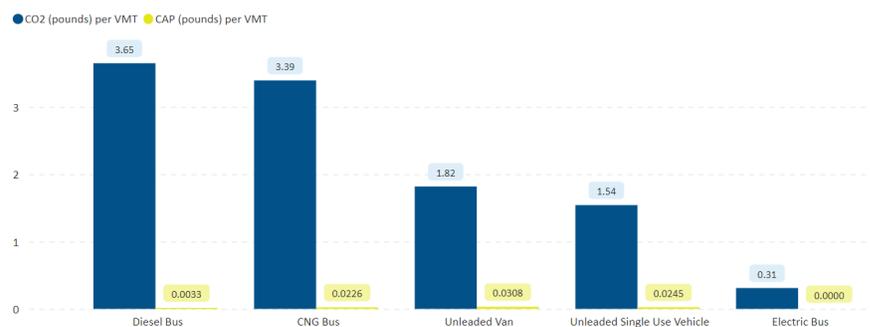
Figure 6. Total fleet CAP by fuel type in 2022



Normalized Fleet CO2 and CAP emissions

An important fleet emissions measure that normalizes CO2 emissions to examine fuel efficiency is emissions per vehicle mile traveled (VMT). In 2022 these normalized values were **2.5 pounds of CO2 per vehicle mile traveled** and **0.0252 pounds of CAP per vehicle mile traveled**. However, as *Figure 7* and *Table 2* show, these normalized values can vary drastically depending on the vehicle and fuel type.

Figure 7. CO2 and CAP per VMT by vehicle and fuel type in 2022



When compared to a diesel bus, a CNG bus produces less CO2 per VMT but more CAP per VMT. Unleaded vehicles produce less CO2 per mile, but more CAP per mile. An electric bus produces very little CO2 and no CAP per VMT.

Table 2. Vehicle miles and fuel consumption by fuel type in 2022

Fuel Type	VMT	Fuel Qty.	Fuel efficiency	MTCO2	CO2/VMT	MTCAP	CAP/VMT
CNG	4,351,845	1,088,589 DGE	4.00 MPG	6,640.39	3.36 lbs.	43.88	0.022 lbs.
Diesel	547,148	89,143 gal	6.14 MPG	910.15	3.66 lbs.	0.81	0.003 lbs.
Electricity	83,483	408,781 kwh	0.20 miles/kwh	11.76	0.31 lbs.	0	0
Unleaded	5,909,788	541,895 gal	10.91 MPG	4,757.84	1.77 lbs.	79.97	0.030 lbs.

CO2 Emissions by Transit Mode

Pierce Transit’s Fixed Route service accounted for 59% of total agency emissions in 2022 (see *Figure 8*).

CO2 per Passenger Mile Traveled (PMT)

Across all modes of transit in 2022, Pierce Transit emitted **0.72 pounds of CO2 per passenger mile traveled (PMT)**, a 27% decrease from 2021. This important measure is sensitive to ridership and load size. According to national averages reported in *Public Transportation’s Role in Responding to Climate Change (2011)*, a private commuter vehicle produces 0.96 pounds of CO2 per PMT.

As seen in *Figure 9*, this measure greatly varies depending on specific transit mode, as passenger mileage and fuel efficiency varies by the service offered. Pierce Transit’s annual CO2 per PMT increased during the pandemic in 2020 and 2021, however, as ridership increased in 2022, the fixed route emissions by passenger mile has significantly improved.

Figure 8. CO2 emissions mix by transit mode in 2022

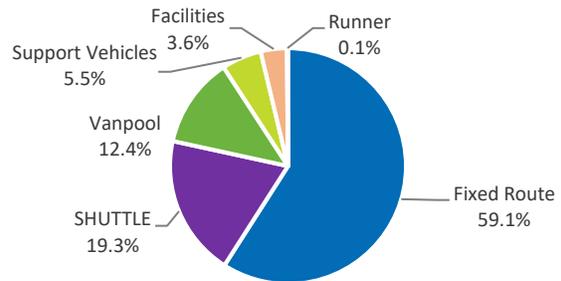


Figure 9. Pounds of CO2 per PMT, by transit mode



Table 3. National averages of CO2 per PMT by transit mode

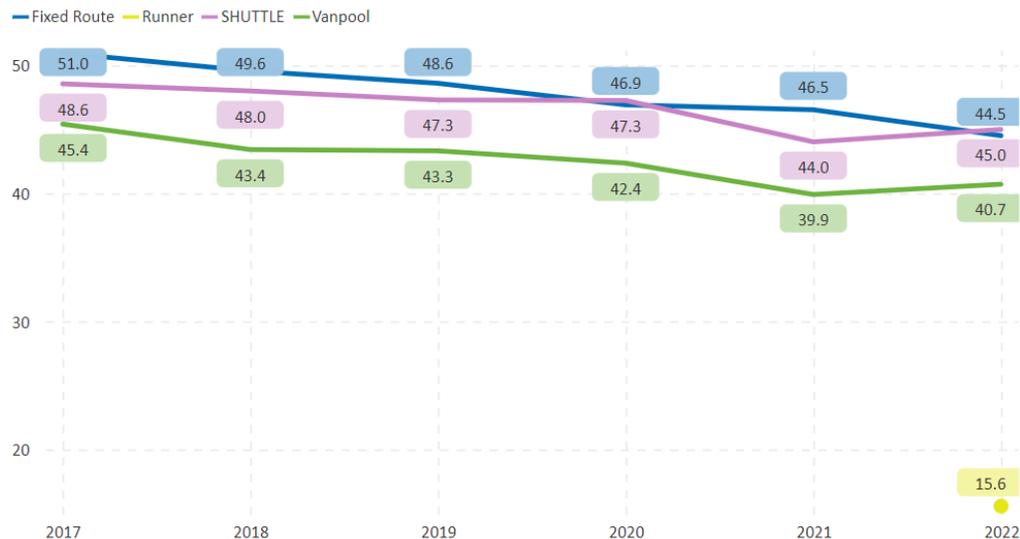
Transit Mode	National Average
Fixed Route	0.64 pounds of CO2 per PMT
Demand Response (SHUTTLE)	3.10 pounds of CO2 per PMT
Vanpool	0.22 pounds of CO2 per PMT

CO2 per Revenue Hour

An important operational efficiency measure that considers traffic congestion and demonstrates efforts to reduce deadheading is **CO2 per revenue hour**. Across all transit mode in 2022, Pierce Transit produced **46.6 pounds of CO2 per revenue hour**, a 3% decrease from the previous year.

Important differences between transit modes can be seen in *Figure 10*.

Figure 10. Pounds of CO2 per revenue hour, by transit mode



Greenhouse gas savings

Total Agency CO2 Savings

CO2 Savings from mode-shift

Greenhouse gas savings are calculated by identifying the number of transit passenger miles traveled annually and using a *mode-shift factor* (a ratio of car miles displaced by public transit miles) and an average MPG for local vehicles to estimate the gallons of gasoline displaced. Using guidance from APTA's "*Recommended Practice for Quantifying Greenhouse Gas Emissions from Transit*" (2009), the emissions savings calculation assumes a medium service area population of < 1,250,000 people with a mode-shift factor of 0.42 and a 20 MPG average for personal vehicles in the region.

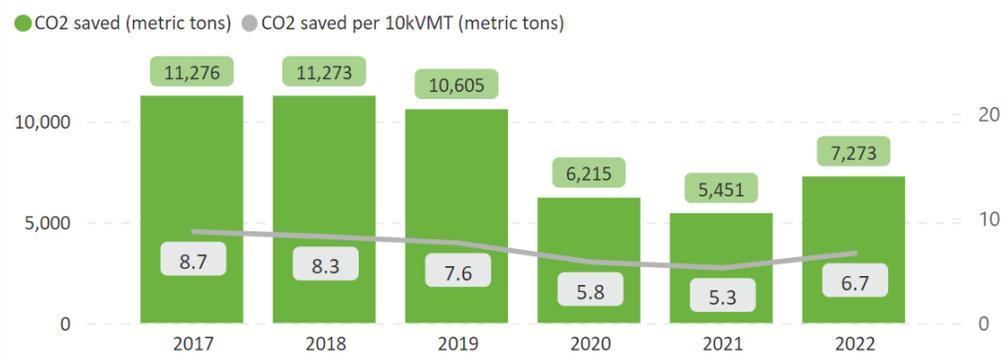
In other words, of the 39,311,504 passenger miles traveled by all modes at Pierce Transit in 2022, we infer that 42% of those miles were displaced by public transit (i.e., 42% of passenger miles *could have* been traveled by personal commuter vehicle instead of transit). This mode-shift **saved 825,542 gallons of gasoline** from personal commuter vehicles, which **saved 7,273 metric tons of CO2 emissions!**

While land-use benefits are widely discussed in public transit savings literature, this report does not calculate these benefits.

Normalized CO2 Savings from mode-shift

The normalized value of these savings in 2022 was **6.7 metric tons of CO2 saved per 10,000 public transit vehicle miles traveled!**

Figure 11. Mode-shift CO2 emissions savings and normalized savings



CO2 Savings by Transit Mode

CO2 savings per VMT

By displacing personal vehicle miles to public transit miles, across all transit modes Pierce Transit **saved 1.47 pounds of CO2 per VMT** in 2022. In 2022, the greatest savings came from fixed route, as shown in *Figure 12*.

Figure 12. Pounds of CO2 saved per VMT, by transit mode

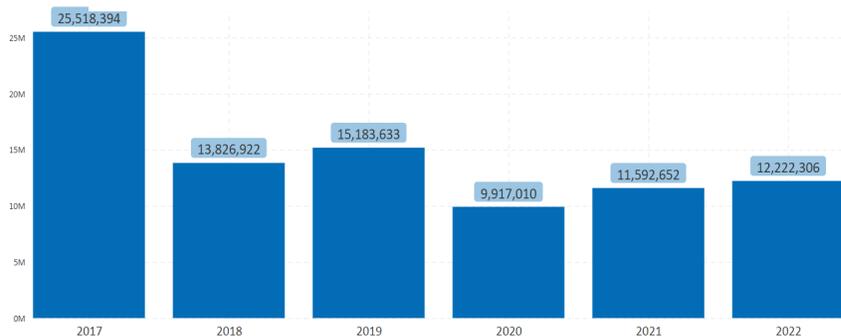


Water Consumption

In 2022, Pierce Transit facilities **used 12,222,306 gallons of water**, a 5% increase from the previous year. The greatest increases were seen at 6th & Skyline (1726% increase), Parkland Transit Center (436% increase) and over the summer 2022 which reached some of the hottest temperatures on record locally.

In 2017 a water leak was discovered and remedied.

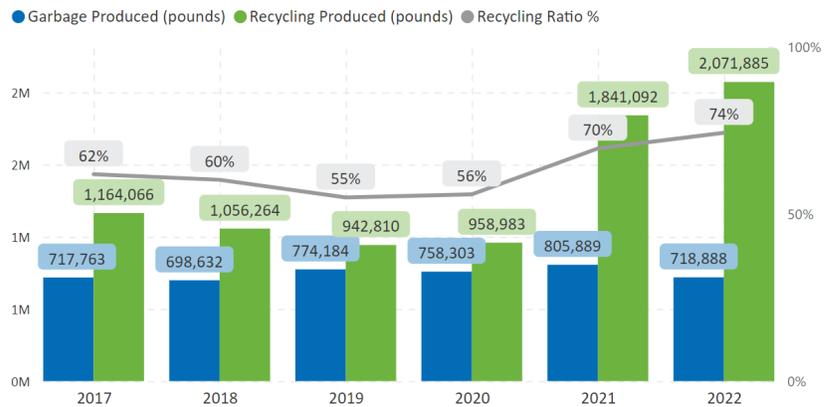
Figure 13. Pierce Transit water consumption in gallons



Garbage & Recycling

In 2022, Pierce Transit facilities disposed of **2,790,773 pounds of waste**, a 5% increase from the previous year. **74% of total waste was recycled**, including vehicle tires, vehicle batteries, oil filters, used oil, paper, and miscellaneous office recyclables.

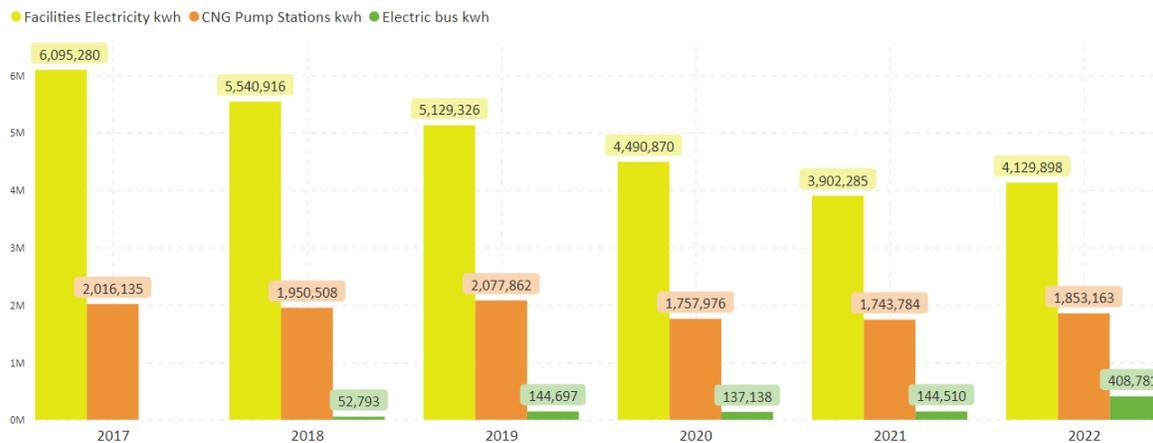
Figure 14. Pierce Transit garbage and recycling



Electricity

In 2022, Pierce Transit used **6,391,842 kwh of electricity**, a 10% increase from the previous year. Facilities accounts for 65% of total electricity used, whereas the CNG pump stations use approximately 29% and electric bus charging stations account for around 6%.

Figure 15. Pierce Transit electricity use



The comparison table below, derived from the U.S. Energy Information Administration (USEIA), highlights the absolute importance of electricity produced through renewable means when considering Scope 2 CO2 emissions.

Table 4. CO2 emissions from different electricity sources

Electricity generated from...	Produces...
Coal	2.23 pounds CO2e/kwh
Petroleum	2.13 pounds CO2e/kwh
Natural gas	0.91 pounds CO2e/kwh
Hydroelectric, wind, solar	EPA considers carbon neutral- 0 pounds CO2e/kwh

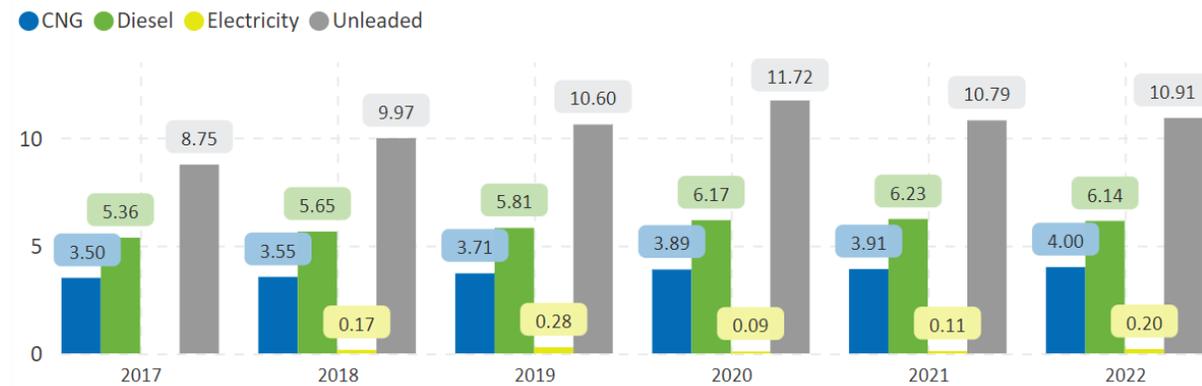
A power mix analysis of regional electricity providers used by Pierce Transit demonstrates a production of **0.063317 lbs. CO2e/kwh**, as this region's electricity production is primarily hydroelectric.

Fuel Efficiency

Miles per gallon/kwh

In 2022, an increase in fuel efficiency among unleaded vehicles, CNG vehicles, and electric buses can be seen when compared to the previous year. Diesel efficiency decreased. Electric bus fuel efficiency is calculated differently, reported in miles per kilowatt hour (kwh).

Figure 16. Miles per gallon/kwh by fuel type

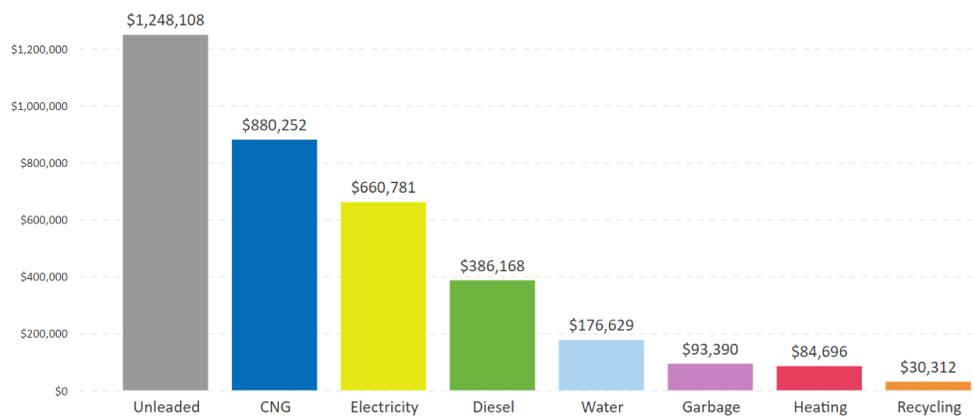


Utilities & Fuel Costs

Total Costs

In 2022, Pierce Transit **spent approximately \$3.6 million on utilities and fuel**, a 23% increase from the previous year (this total and the totals in *Figure 16* subtracts an estimated fuel cost for the Sound Transit fleet). Fuel costs include delivery charges.

Figure 17. Pierce Transit utilities and fuel costs in 2022



In 2022, the greatest increase in utilities or fuel was from total unleaded fuel costs (48% increase from 2021) and total diesel fuel costs (36% increase from 2021). Heating cost (gas) decreased (by 7%).

Fuel cost per VMT

To examine fuel cost efficiencies, cost per vehicle mile traveled (VMT) is calculated by fuel type. In 2022, the diesel bus cost per VMT was the highest at \$0.71 per mile.

Figure 18. Fuel cost per vehicle mile traveled

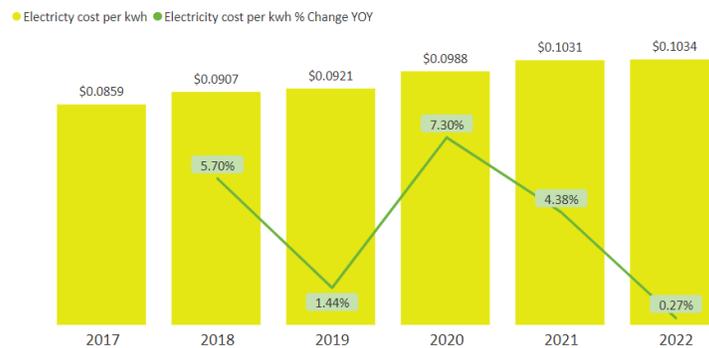


Note: CNG cost per VMT above includes the cost of electricity required to pump the CNG. Mileage and fuel cost from contractors (e.g., First Transit, Medstar) is not included.

Cost per kwh

As public transit agencies consider converting more vehicles to electric, it is important to track the cost of electricity per kilowatt hour (kwh). This is also important for extrapolating the cost to convert specific routes to an electric fleet based on route mileage. Electricity cost per kwh for this report is calculated using *actual kilowatt hours* recorded on utilities invoices and *total annual cost* which includes delivery charges, service fees, etc. In 2022 it cost Pierce Transit approximately **\$0.1034 per kwh**, a 0.3% increase from the previous year.

Figure 19. Cost per kilowatt hour and annual percent change



Future Data Projects

It is important for public transit agencies to diligently track their emissions and other sustainability measures to assess what can be improved. For future sustainability reports, it may be in the agency’s best interest to examine the following data:

Indirect “Scope 3” Emissions

These are all other indirect emissions within Pierce Transit’s value chain.

- Employees traveling to work and business travel (non-revenue support vehicles are already included in Scope 1 emissions)
- Waste and recycling
- Customer transit access trips (e.g., passenger traveling to transit center prior to boarding bus)
- Vehicle and equipment manufacturing and disposal
- Upstream (well-to-tank) emissions from fuel extraction, refining and transportation

However, most emissions in Scope 3 are reported by the supplier or manufacturer as their Scope 1 emissions.

Land-Use Benefit CO2 Savings

The current report examines mode-shift as a factor for emissions savings, however, land-use benefit incorporates the added benefit of public transit within a specific area; walking, cycling, and density effects emissions. When private vehicle travel is reduced, through either mode-shift or land-use benefit, emissions are further saved. An analysis of this scope has been conducted for larger cities such as Seattle, San Francisco, and Portland, however a similar analysis could be done for the Pierce Transit Benefit Area (PTBA).

Appendix

Appendix A. Vehicle classification and criteria air pollutant calculations table

Asset Category	Fuel Category	APTA Category	Transit Mode	Carbon Monoxide (g)	Nitrogen Oxides (g)	Nonmethane Hydrocarbons (g)	Particulate Matter (g)	Sulfur Oxides (g)
MBDO	CNG	PT Bus	Fixed Route	Miles *10.01	Miles *.22	Miles *.02	Miles *.003	0
MBDO	Diesel	PT Bus	Fixed Route	Miles *0.74	Miles *0.49	Miles *0.14	Miles *0.12	0
MBDO	Unleaded	Van	Fixed Route	Miles *11.84	Miles *0.95	Miles *1.224	Miles *.0094	0
MBDO	Electric	PT Bus	Fixed Route	N/A	N/A	N/A	N/A	N/A
VPDO	Unleaded	Van	Vanpool	Miles *11.84	Miles *0.95	Miles *1.224	Miles *.0094	0
DPDO	CNG	Van	SHUTTLE	Miles *2.632	Miles *0.226	Miles *0.143	Miles *0.0334	0
DRDO	Unleaded	Van	SHUTTLE	Miles *11.84	Miles *0.95	Miles *1.224	Miles *.0094	0
DRPUR	Unleaded	Van	SHUTTLE	Miles *11.84	Miles *0.95	Miles *1.224	Miles *.0094	0
Non-Revenue	Unleaded	Single Occupied Vehicle	Non-Revenue	Miles *9.4	Miles *.693	Miles *1.034	Miles *.0085	Miles *.007
Non-Revenue	CNG	N/A	Miscellaneous Shop Equipment	N/A	N/A	N/A	N/A	N/A
Non-Revenue	Diesel	N/A	Miscellaneous Shop Equipment	N/A	N/A	N/A	N/A	N/A

Appendix B. References

“Electricity in the United States” (USEIA) [Link](#)

“Alternative Fuels Data Center” (Energy.gov) [Link](#)

“Quantifying Greenhouse Gas Emissions from Transit” (APTA, 2009) [Link](#)

“Recommended Practices for Quantifying Greenhouse Gas Emissions from Transit” (APTA, 2009) [Link](#)

“Quantifying and Reporting Transit Sustainability Metrics” (APTA, 2012) [Link](#)

“Criteria Air Pollutants” (EPA, 2015) [Link](#)

“Public Transit’s Role in Reducing Greenhouse Gas Emissions” (USDOT, 2010) [Link](#)

“Greenhouse Gases Equivalencies Calculator” (EPA) [Link](#)