

\$3.30

RA FONTES

R A Fontes - PO Box 144, Lake Oswego, OR 97034 - rfontes@g.com 2/7/18

At \$3.30/passenger mile, Portland Streetcar operating costs are much higher than those of most other transit.

Table data from 2016 National Transit Database, October 2017 (attached-passengers/mile in orange highlights)

At \$3.30/passenger mile, Portland Streetcar operating costs are far, far higher than the total costs of owning a car.

Table data from AAA, "Your driving costs, 2017"

Fleet-based on-demand autonomous vehicles should cost less to operate than similar personal cars.

Transit OPERATIONS costs per passenger mile from NTD		Medium sedan TOTAL costs per mile		Columbia University - Earth Institute, "Transforming Personal Mobility", January 2013: TOTAL cost estimate per vehicle mile for fleet-owned, self-driving medium sedans used for shared, on-demand service	
Portland streetcar	\$3.30	From AAA "Your driving costs" 2017:			
WES	\$2.03	car driven 10,000 miles per year	\$0.7163		
Aerial Tramway	\$1.90	car driven 15,000 miles per year	\$0.5447		\$0.41
Streetcar: national average	\$1.80	car driven 20,000 miles per year	\$0.4712		
Trimet Bus	\$0.91				
MAX	\$0.57				

Streetcar's inability or unwillingness to get passengers to pay their fair share means that costs are passed on to TriMet users in the forms of higher fares and/or degraded service.

Streetcar charges \$2.00 for a full fare; TriMet \$2.50. Streetcar's \$40 monthly pass breaks even with cash fares after only 20 rides; TriMet's \$100 monthly pass needs 40 rides to break even. Streetcar's estimated \$4.40 per I.D. holder bulk annual pass fee to qualifying institutions which sponsor streetcars is totally off the charts and has no comparison to the small breaks TriMet is able to offer. TriMet's \$7.5 million annual subsidy to streetcar must be passed on to TriMet riders including Portland residents.

Management's inclusion of sponsorship revenue as part of farebox recovery on page 10 of the 2017 report is highly misleading and not in accordance with FTA standards.

Streetcar's farebox recovery is less than what the report states, and far below TriMet's roughly 30% rate.

We can expect streetcar ridership to plummet once shared autonomous vehicles (AVs) become available, especially among those who pay fares out of their own pocket.

Trips using shared AVs promise to be safer, far more convenient, almost always faster, and often cheaper than those by transit. Streetcar is especially vulnerable to AV competition because trips are so short and will face AV's lowest possible fares. Streetcar's downtown location should coincide with very high AV availability.

Streetcar's funding is subject to severe erosion from AVs.

Paid parking is probably doomed. TriMet's own AV challenges would prevent it from supporting streetcar.

It's in the self-interest of AV fleet owners to foster carpooling, especially during high demand periods. It would minimize capital costs and maximize per trip revenue while lowering customers fares. Fleet owners' computers will already have trip information for every customer, making carpooling a natural fit.

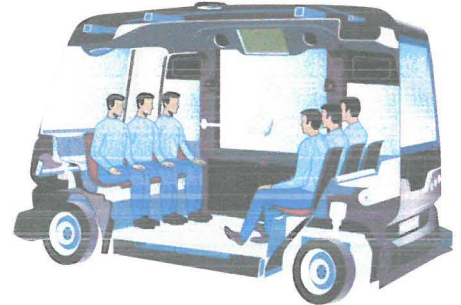
If shared AVs get people to carpool, they could hold down traffic congestion indefinitely, eliminating the need to overbuild highways or require congestion pricing.

Electric propulsion would enable owners to configure shared AVs to carry more people than today's cars.

AVs are a lot closer than many people realize.



The little low-speed EZ 10 pictured is in use in projects around the world. While only 13 feet long, or about the same as a subcompact, its electric propulsion system enables the passenger compartment to extend the entire length of the vehicle, giving it a capacity for 12 passengers (six seated and six standing).

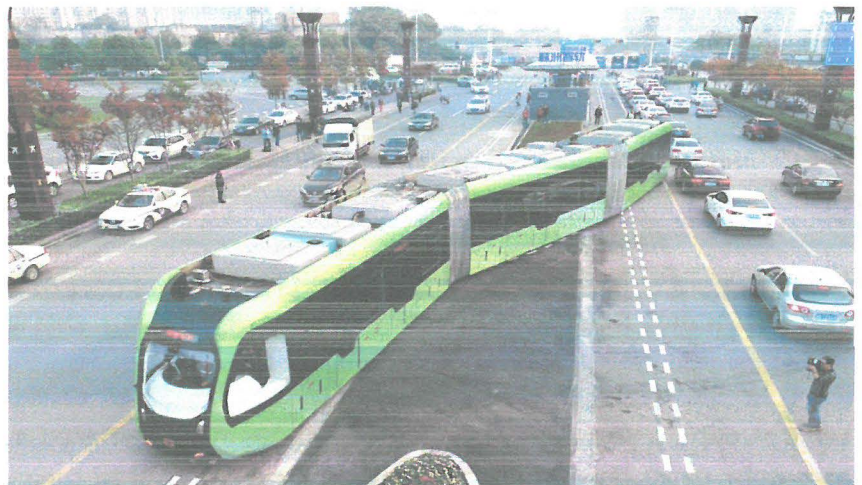


Google's Waymo division is now testing self-driving Chrysler Pacifica minivans in traffic on public streets in Arizona WITHOUT HUMAN BACKUP DRIVERS.

General Motors plans the "mass testing" of autonomous vehicles without manual controls next year.

Ford promises to start mass producing AVs for fleet-use-only within four years.

The self-driving BRT pictured has completed its test-track phase and is slated to start operations within the next few months in Zhuzhou, China. It really is a bus with rubber tires, and follows those special double dashed lines on the pavement. This three-section model can hold up to 300 riders, and a five-section version can hold 500, or more than a MAX train.



The 19th century and the era when unbridled growth of urban rail transit made sense are long gone. We need to accept that reality if we want sustainable transit contributing to society into the future.

55 — 2016 National Transit Profiles: Full Reporting Agencies

<http://www.portlandoregon.gov/>

1120 SW 5th Street
Room 800
Portland, OR 97204

City of Portland 2016 Annual Agency Profile

Director, Portland Transportation: Ms. Leah Treat

Urbanized Area Statistics - 2010 Census

Portland, OR-WA
524 Square Miles
1,849,898 Population
24 Pop. Rank out of 498 UZAs

Service Area Statistics

11 Square Miles
72,832 Population

General Information

Service Consumption
6,306,639 Annual Passenger Miles (PMT)
6,416,746 Annual Unlinked Trips (UPT)
20,993 Average Weekday Unlinked Trips
13,261 Average Saturday Unlinked Trips
8,931 Average Sunday Unlinked Trips

Database Information

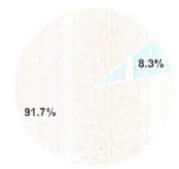
NTDID: 00058
Reporter Type: Full Reporter

Financial Information

Sources of Operating Funds Expended

Fare Revenues	\$1,573,689	8.3%
Local Funds	\$17,364,440	91.7%
State Funds	\$0	0.0%
Federal Assistance	\$0	0.0%
Other Funds	\$0	0.0%
Total Operating Funds Expended	\$18,938,129	100.0%

Operating Funding Sources



Sources of Capital Funds Expended

Fare Revenues	\$0	0.0%
Local Funds	\$866,349	98.3%
State Funds	\$0	0.0%
Federal Assistance	\$15,175	1.7%
Other Funds	\$0	0.0%
Total Capital Funds Expended	\$881,524	100.0%

Capital Funding Sources



Modal Characteristics

Vehicles Operated in Maximum Service

Modal Overview

Mode	Directly Operated	Purchased Transportation	Revenue Vehicles	Systems and Guideways	Facilities and Stations	Other	Total
Street Car Rail	-	14	\$590,880	\$290,644	\$0	\$0	\$881,524
Aerial Tramway	-	2	\$0	\$0	\$0	\$0	\$0
Total	-	16	\$590,880	\$290,644	\$0	\$0	\$881,524

Uses of Capital Funds

Summary of Operating Expenses (OE)

Salary, Wages, Benefits	\$2,301,305	12.2%
Materials and Supplies	\$1,365,419	7.2%
Purchased Transportation	\$12,432,519	65.7%
Other Operating Expenses	\$2,830,910	15.0%
Total Operating Expenses	\$18,930,153	100.0%
Reconciling OE Cash Expenditures	\$7,976	
Purchased Transportation (Reported Separately)	\$0	

Operation Characteristics

Mode	Operating Expenses	Fare Revenues	Uses of Capital Funds	Annual Passenger Miles	Annual Unlinked Trips	Annual Vehicle Revenue Miles	Annual Vehicle Revenue Hours	Fixed Guideway Directional Route Miles	Vehicles Available for Maximum Service	Vehicles Operated in Maximum Service	Average Percent Spare Vehicles	Average Fleet Age in Years ^a
Street Car Rail	\$16,377,407 ¹	\$854,201 ¹	\$881,524	4,960,607	4,313,571	405,109	67,184	15.4	17	14 ¹	17.7%	9.1
Aerial Tramway	\$2,552,746	\$719,488	\$0	1,346,032	2,103,175	32,729	3,328	1.3	2	2	0.0%	10.0
Total	\$18,930,153	\$1,573,689	\$881,524	6,306,639	6,416,746	437,838	70,512	16.7	19	16	15.8%	

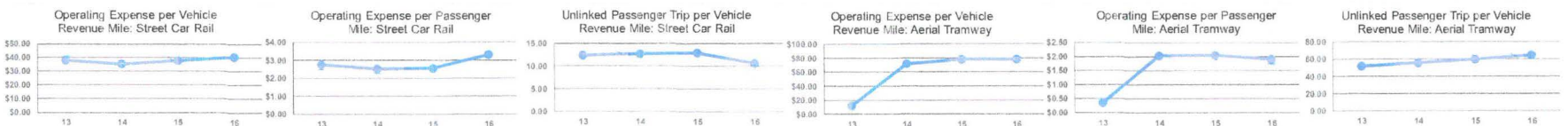
Performance Measures

Service Efficiency

Mode	Operating Expenses per Vehicle Revenue Mile	Operating Expenses per Vehicle Revenue Hour
Street Car Rail	\$40.43	\$243.77
Aerial Tramway	\$78.00	\$767.05
Total	\$43.24	\$269.47

Service Effectiveness

Mode	Operating Expenses per Passenger Mile	Operating Expenses per Unlinked Passenger Trip	Unlinked Trips per Vehicle Revenue Mile	Unlinked Trips per Vehicle Revenue Hour
Street Car Rail	\$3.30	\$3.80	10.7	64.2
Aerial Tramway	\$1.90	\$1.21	64.3	632.0
Total	\$3.09	\$2.95	14.7	91.0



Notes:

^aDemand Response - Taxi (DT) and non-dedicated fleets do not report fleet age data.

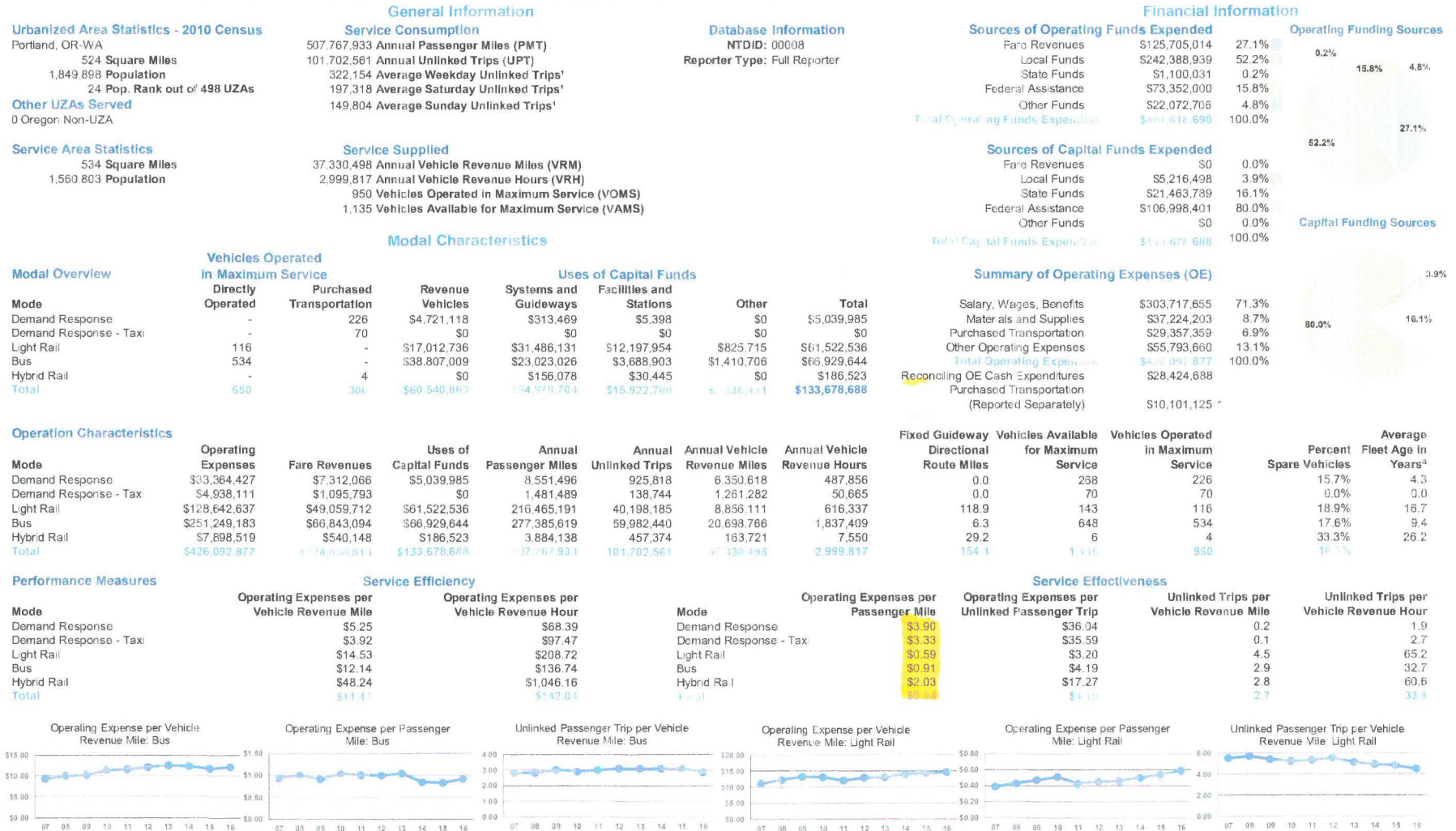
¹Includes data for a contract with another reporter.

²This agency has a purchased transportation relationship in which they buy service from Tri-County Metropolitan Transportation District of Oregon (NTDID: 00008), and in which the data are captured in this report for mode SR/PT.

Tri-County Metropolitan Transportation District of Oregon

2016 Annual Agency Profile

General Manager: Mr. Neil McFarlane

<http://www.tmc.org/>1800 SW 1st Avenue, Suite 300
Portland, OR 97201-5354

2016 National Transit Profile Summary - Full Reporters

General Information				Financial Information			
Service Supplied		Service Consumed		Sources of Operating Funds Expended (Millions)		Operating Funding Sources	
4,095,126,612 Annual Vehicle Revenue Miles (VRM)		56,321,611,936 Annual Passenger Miles (PMT)		Fare Revenues \$15,439.4 32.2%		24.8%	
273,616,436 Annual Vehicle Revenue Hours (VRH)		10,148,434,935 Annual Unlinked Trips (UPT)		Local Funds \$15,145.5 31.6%		6.9%	
112,085 Vehicles Operated in Maximum Service (VOMS)		33,134,617 Average Weekday Unlinked Trips¹		State Funds \$11,775.4 24.5%		4.8%	
134,656 Vehicles Available for Maximum Service (VAMS)		18,111,355 Average Saturday Unlinked Trips¹		Federal Assistance \$3,322.0 6.9%			
		14,167,402 Average Sunday Unlinked Trips¹		Other Funds \$2,290.8 4.8%			
				Total Operating Funds Expended \$47,972.8 100.0%			
Modal Overview		Vehicles Operated in Maximum Service		Uses of Capital Funds (Millions)		Sources of Capital Funds Expended (Millions)	
Mode	Directly Operated	Purchased Transportation	Revenue Vehicles	Systems and Guideways	Facilities and Stations	Other	Total
Aerial Tramway	-	2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Alaska Railroad	39	-	\$1.7	\$41.6	\$1.5	\$1.8	\$46.5
Bus	38,366	8,356	\$2,449.3	\$527.8	\$378.5	\$200.4	\$4,056.1
Bus Rapid Transit	277	23	\$7.9	\$80.1	\$8.9	\$0.5	\$97.4
Cable Car	27	-	\$0.8	\$0.0	\$0.0	\$0.0	\$0.8
Commuter Bus	2,344	1,382	\$116.5	\$100.1	\$34.6	\$1.9	\$253.2
Commuter Rail	4,966	1,318	\$576.9	\$1,915.4	\$450.1	\$137.9	\$3,080.3
Demand Response	6,087	18,195	\$220.9	\$19.2	\$33.9	\$15.0	\$289.0
Demand Response - Taxi	-	3,902	\$1.3	\$0.0	\$0.0	\$0.0	\$1.3
Ferryboat	77	48	\$177.3	\$1.5	\$134.8	\$2.9	\$316.4
Heavy Rail	9,435	32	\$502.3	\$3,091.0	\$1,815.0	\$215.7	\$5,624.0
Hybrid Rail	-	40	\$7.7	\$16.5	\$6.5	\$0.4	\$31.1
Inclined Plane	6	-	\$0.0	\$5.3	\$0.1	\$0.0	\$5.4
Light Rail	1,522	80	\$257.2	\$2,583.5	\$403.4	\$47.6	\$3,291.7
Monorail/Automated	110	12	\$7.6	\$17.5	\$4.5	\$1.3	\$30.9
Publico	-	1,884	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Street Car Rail	180	53	\$22.1	\$46.1	\$36.8	\$10.1	\$115.1
Trolleybus	412	-	\$199.7	\$3.8	\$0.0	\$1.6	\$205.2
Vanpool	6,987	5,923	\$17.1	\$1.0	\$0.2	\$0.1	\$18.3
Total	70,835	41,250	\$4,566.3	\$8,450.4	\$3,808.9	\$637.2	\$17,462.8
Operation Characteristics				Summary of Operating Expenses (OE) (Millions)			
Mode	Operating Expenses (Millions)	Fare Revenues (Millions)	Uses of Capital Funds (Millions)	Annual Passenger Miles (Millions)	Annual Unlinked Trips (Millions)	Annual Vehicle Revenue Miles (Millions)	Annual Vehicle Revenue Hours (Millions)
Aerial Tramway	\$2.6	\$0.7	\$0.0	1.3	2.1	0.0	0.0
Alaska Railroad	\$46.9	\$21.2	\$46.5	23.0	0.2	1.1	0.0
Bus	\$20,516.8	\$5,020.5	\$4,056.1	17,961.1	4,727.6	1,783.1	151.3
Bus Rapid Transit	\$193.8	\$63.3	\$97.4	188.7	66.5	10.3	1.1
Cable Car	\$62.1	\$29.2	\$0.8	7.2	5.8	0.3	0.1
Commuter Bus	\$993.8	\$514.4	\$253.2	2,261.2	91.1	123.1	4.8
Commuter Rail	\$5,952.3	\$3,092.9	\$3,080.3	11,767.7	499.5	344.4	10.9
Demand Response	\$3,480.9	\$262.8	\$289.0	865.0	93.1	710.5	49.6
Demand Response - Taxi	\$210.8	\$29.1	\$1.3	78.4	7.6	59.7	3.9
Ferryboat	\$664.5	\$194.9	\$316.4	489.4	73.8	3.7	0.4
Heavy Rail	\$9,475.2	\$5,413.3	\$5,624.0	18,356.6	3,848.0	675.9	33.7
Hybrid Rail	\$91.8	\$8.7	\$31.1	88.7	7.2	3.1	0.1
Inclined Plane	\$3.5	\$3.7	\$5.4	0.5	1.0	0.0	0.0
Light Rail	\$2,018.8	\$517.4	\$3,291.7	2,565.8	497.6	111.4	7.1
Monorail/Automated	\$87.1	\$40.0	\$30.9	33.5	24.2	5.1	0.4
Publico	\$31.5	\$30.6	\$0.0	90.3	21.4	19.3	1.8
Street Car Rail	\$182.9	\$46.1	\$115.1	101.6	51.9	6.3	0.9
Trolleybus	\$274.3	\$82.8	\$205.2	154.0	94.1	11.3	1.6
Vanpool	\$157.4	\$124.2	\$18.3	1,287.8	35.8	226.6	5.8
Total	\$44,447.0	\$15,495.7	\$17,462.8	56,321.6	10,148.4	4,095.1	273.6
				Capital Funding Sources			
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Monorail/Automated	\$87.1	\$40.0	\$30.9	33.5	24.2	5.1	0.4
Publico	\$31.5	\$30.6	\$0.0	90.3	21.4	19.3	1.8
Street Car Rail	\$182.9	\$46.1	\$115.1	101.6	51.9	6.3	0.9
Trolleybus	\$274.3	\$82.8	\$205.2	154.0	94.1	11.3	1.6
Vanpool	\$157.4	\$124.2	\$18.3	1,287.8	35.8	226.6	5.8
Total	\$44,447.0	\$15,495.7	\$17,462.8	56,321.6	10,148.4	4,095.1	273.6
				Capital Funding Sources			
Mode	Operating Expenses (Millions)	Fare Revenues (Millions)	Uses of Capital Funds (Millions)	Annual Passenger Miles (Millions)	Annual Unlinked Trips (Millions)	Annual Vehicle Revenue Miles (Millions)	Annual Vehicle Revenue Hours (Millions)
Aerial Tramway	\$2.6	\$0.7	\$0.0	1.3	2.1	0.0	0.0
Alaska Railroad	\$46.9	\$21.2	\$46.5	23.0	0.2	1.1	0.0
Bus	\$20,516.8	\$5,020.5	\$4,056.1	17,961.1	4,727.6	1,783.1	151.3
Bus Rapid Transit	\$193.8	\$63.3	\$97.4	188.7	66.5	10.3	1.1
Cable Car	\$62.1	\$29.2	\$0.8	7.2	5.8	0.3	0.1
Commuter Bus	\$993.8	\$514.4	\$253.2	2,261.2	91.1	123.1	4.8
Commuter Rail	\$5,952.3	\$3,092.9	\$3,080.3	11,767.7	499.5	344.4	10.9
Demand Response	\$3,480.9	\$262.8	\$289.0	865.0	93.1	710.5	49.6
Demand Response - Taxi	\$210.8	\$29.1	\$1.3	78.4	7.6	59.7	3.9
Ferryboat	\$664.5	\$194.9	\$316.4	489.4	73.8	3.7	0.4
Heavy Rail	\$9,475.2	\$5,413.3	\$5,624.0	18,356.6	3,848.0	675.9	33.7
Hybrid Rail	\$91.8	\$8.7	\$31.1	88.7	7.2	3.1	0.1
Inclined Plane	\$3.5	\$3.7	\$5.4	0.5	1.0	0.0	0.0
Light Rail	\$2,018.8	\$517.4	\$3,291.7	2,565.8	497.6	111.4	7.1
Monorail/Automated	\$87.1	\$40.0	\$30.9	33.5	24.2	5.1	0.4
Publico	\$31.5	\$30.6	\$0.0	90.3	21.4	19.3	1.8
Street Car Rail	\$182.9	\$46.1	\$115.1	101.6	51.9	6.3	0.9
Trolleybus	\$274.3	\$82.8	\$205.2	154.0	94.1	11.3	1.6
Vanpool	\$157.4	\$124.2	\$18.3	1,287.8	35.8	226.6	5.8
Total	\$44,447.0	\$15,495.7	\$17,462.8	56,321.6	10,148.4	4,095.1	273.6
				Capital Funding Sources			
Mode	Operating Expenses (Millions)	Fare Revenues (Millions)	Uses of Capital Funds (Millions)	Annual Passenger Miles (Millions)	Annual Unlinked Trips (Millions)	Annual Vehicle Revenue Miles (Millions)	Annual Vehicle Revenue Hours (Mill

Notes:

¹Average Unlinked Trips not available for Demand Response - Taxi.²Demand Response - Taxi, Publico, and non-dedicated fleets do not report fleet age data.

Performance Measures

Service Efficiency

Service Effectiveness

Mode	Operating Expenses per Vehicle Revenue Mile	Operating Expenses per Vehicle Revenue Hour
Aerial Tramway	\$78.00	\$767.05
Alaska Railroad	\$42.50	\$1,150.84
Bus	\$11.51	\$135.64
Bus Rapid Transit	\$18.83	\$175.91
Cable Car	\$240.11	\$445.69
Commuter Bus	\$8.08	\$205.56
Commuter Rail	\$17.28	\$545.65
Demand Response	\$4.90	\$70.19
Demand Response - Taxi	\$3.53	\$54.53
Ferryboat	\$181.19	\$1,534.38
Heavy Rail	\$14.02	\$281.29
Hybrid Rail	\$29.70	\$708.97
Inclined Plane	\$108.51	\$269.39
Light Rail	\$18.11	\$284.17
Monorail/Automated	\$17.16	\$194.41
Publico	\$1.63	\$18.01
Street Car Rail	\$28.95	\$204.16
Trolleybus	\$24.26	\$166.84
Vanpool	\$0.69	\$27.28
Total	\$10.85	\$162.44

Mode	Operating Expenses per Passenger Mile	Operating Expenses per Unlinked Passenger Trip	Unlinked Trips per Vehicle Revenue Mile	Unlinked Trips per Vehicle Revenue Hour
Aerial Tramway	\$1.90	\$1.21	64.3	632.0
Alaska Railroad	\$2.04	\$250.41	0.2	4.6
Bus	\$1.14	\$4.34	2.7	31.3
Bus Rapid Transit	\$1.03	\$2.91	6.5	60.4
Cable Car	\$8.58	\$10.70	22.4	41.7
Commuter Bus	\$0.44	\$10.91	0.7	18.8
Commuter Rail	\$0.51	\$11.92	1.5	45.8
Demand Response	\$4.02	\$37.37	0.1	1.9
Demand Response - Taxi	\$2.89	\$27.76	0.1	2.0
Ferryboat	\$1.36	\$9.01	20.1	170.3
Heavy Rail	\$0.52	\$2.46	5.7	114.2
Hybrid Rail	\$1.03	\$12.69	2.3	55.9
Inclined Plane	\$6.53	\$3.41	31.8	79.1
Light Rail	\$0.79	\$4.06	4.5	70.0
Monorail/Automated	\$2.60	\$3.60	4.8	54.0
Publico	\$0.35	\$1.48	1.1	12.2
Street Car Rail	\$1.80	\$3.52	8.2	58.0
Trolleybus	\$1.78	\$2.92	8.3	57.2
Vanpool	\$0.12	\$4.40	0.2	6.2
Total	\$0.79	\$4.38	2.5	37.1

