

# Performance Measure Summary - San Francisco-Oakland CA

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2017. There is no single performance measure that experts agree "says it all". A few key points should be recognized by users of the Urban Mobility Scorecard data.

**Use the trends** - The multi-year performance measures are better indicators, in most cases, than any single year. Examining a few measures over many years reduces the chance that data variations or the estimating procedures may have caused a "spike" in any single year. (5 years is 5 times better than 1 year.)

**Use several measures** - Each performance measure illustrates a different element of congestion. (The view is more interesting from atop several measures.)

**Compare to similar regions** - Congestion analyses that compare areas with similar characteristics (for example, population, growth rate, road and public transportation system design) are usually more insightful than comparisons of different regions. (Los Angeles is not Peoria.)

**Compare ranking changes and performance measure values** - In some performance measures, a small change in the value may cause a significant change in rank from one year to the next. This is the case when there are several regions with nearly the same value. (15 hours is only 1 hour more than 14 hours.)

**Consider the scope of improvement options** - Any improvement project in a corridor within most of the regions will only have a modest effect on the regional congestion level. (To have an effect on areawide congestion, there must be significant change in the system or service.)

## Performance Measures and Definition of Terms

**Travel Time Index** - A measure of congestion that focuses on each trip and each mile of travel. It is calculated as the ratio of travel time in the peak period to travel time in free-flow. A value of 1.30 indicates that a 20-minute free-flow trip takes 26 minutes in the peak.

**Planning Time Index** - A travel time reliability measure that represents the total travel time that should be planned for a trip. Computed with the 95th percentile travel time it represents the amount of time that should be planned for a commute trip to be late for only 1 day a month. If it is computed with the 80th percentile travel time it represents the amount of time that should be planned for a trip to be late for only 1 day a week. A PTI of 2.00 means that for a 20-minute trip in light traffic, 40 minutes should be planned.

**Peak Commuters** - Number of travelers who begin a trip during the morning or evening peak travel periods (6 to 10 a.m. and 3 to 7 p.m.). "Commuters" are private vehicle users unless specifically noted.

**Annual Delay per Commuter** - A yearly sum of all the per-trip delays for those persons who travel in the peak period (6 to 10 a.m. and 3 to 7 p.m.). This measure illustrates the effect of traffic slowdowns as well as the length of each trip.

**Total Delay** - The overall size of the congestion problem. Measured by the total travel time above that needed to complete a trip at free-flow speeds. The ranking of total delay usually follows the population ranking (larger regions usually have more delay).

**Free-Flow Speeds** - These values are derived from time periods with lighter traffic volumes in the INRIX speed database. They are used as the national comparison thresholds. Other speed thresholds may be appropriate for urban project evaluations or sub-region studies.

**Excess Fuel Consumed** - Increased fuel consumption due to travel in congested conditions rather than free-flow conditions.

**Congestion Cost** - Value of travel delay for 2017 (estimated at \$18.29 per hour of person travel and \$59.94 per hour of truck time) and excess fuel consumption estimated using state average cost per gallon.

**Urban Area** - The developed area (population density more than 1,000 persons per square mile) within a metropolitan region. The urban area boundaries change frequently (every year for most growing areas), so increases include both new growth and development that was previously in areas designated as rural.

**Number of Rush Hours** - Time when the road system might have congestion.

# Mobility Data for San Francisco-Oakland CA

Inventory Measures	2017	2016	2015	2014	2013	2012
<b>Urban Area Information</b>						
Population (1000s)	3,540	3,520	3,500	3,480	3,470	3,440
Rank	13	13	13	13	13	13
Commuters (1000s)	1,295	1,284	1,274	1,264	1,278	1,267
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	39,755	39,755	38,656	28,102	27,612	27,500
Arterial Streets	20,843	21,002	21,367	21,700	23,900	23,720
<b>Cost Components</b>						
Value of Time (\$/hour)	18.12	17.91	17.69	17.67	17.39	17.14
Commercial Cost (\$/hour)	52.14	50.20	46.87	44.82	41.23	39.66
Gasoline (\$/gallon)	2.96	2.78	3.18	3.63	3.89	3.89
Diesel (\$/gallon)	2.95	2.68	2.86	3.85	4.12	4.20
System Performance	2017	2016	2015	2014	2013	2012
<b>Congested Travel (% of peak VMT)</b>	52.3	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	35.8	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	6.5	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	95,037	93,677	92,800	91,650	89,783	88,250
Rank	6	6	6	6	6	5
Fuel per Peak Auto Commuter (gallons)	39	37	37	36	35	35
Rank	1	1	1	1	1	1
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	253,838	250,205	245,689	240,496	233,493	227,441
Rank	5	5	5	5	4	4
Delay per Auto Commuter (pers-hrs)	103	102	101	99	97	95
Rank	2	2	2	2	2	2
<b>Travel Time Index</b>						
Rank	1.50	1.50	1.49	1.48	1.46	1.44
Rank	2	1	1	1	2	2
<b>Commuter Stress Index</b>						
Rank	1.62	--	--	--	--	--
Rank	2	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	2.69	--	--	--	--	--
Rank	2	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	5,175	5,014	4,877	4,805	4,598	4,416
Rank	5	5	5	5	4	4
Cost per Auto Commuter (\$)	2,619	2,597	2,536	2,471	2,423	2,389
Rank	2	2	2	1	1	1
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	10,661	10,509	10,319	10,101	9,807	9,553
Rank	5	5	5	5	4	4
Annual Gallons of Wasted Fuel (000)	20,148	19,860	19,674	19,430	19,034	18,709
Rank	6	6	6	6	6	5
Annual Congestion Cost (\$ million)	547	516	481	472	433	411
Rank	5	5	5	5	5	4

\* Note: Zeroes in the table reflect values less than 0.5.

# Mobility Data for San Francisco-Oakland CA

Inventory Measures	2011	2010	2009	2008	2007	2006
<b>Urban Area Information</b>						
Population (1000s)	3,410	3,400	3,375	3,360	3,330	3,300
Rank	13	13	13	13	13	13
Commuters (1000s)	1,253	1,245	1,233	1,223	1,210	1,197
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	27,300	27,220	27,100	27,000	27,100	28,500
Arterial Streets	23,690	23,620	23,600	23,500	24,200	24,900
<b>Cost Components</b>						
Value of Time (\$/hour)	16.79	16.28	16.01	16.07	15.47	15.06
Commercial Cost (\$/hour)	44.62	42.50	41.83	40.77	39.30	37.88
Gasoline (\$/gallon)	3.51	3.05	2.61	3.84	3.24	2.88
Diesel (\$/gallon)	4.02	3.20	2.71	4.39	3.60	3.17
System Performance	2011	2010	2009	2008	2007	2006
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	83,871	83,084	82,674	86,156	86,978	86,481
Rank	6	6	6	5	5	5
Fuel per Peak Auto Commuter (gallons)	33	33	31	32	33	34
Rank	3	3	3	3	1	1
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	214,189	208,286	203,385	201,857	203,783	202,619
Rank	6	6	6	5	5	5
Delay per Auto Commuter (pers-hrs)	93	90	88	86	86	85
Rank	2	2	3	2	2	2
<b>Travel Time Index</b>						
Rank	1.43	1.41	1.41	1.42	1.41	1.41
Rank	2	2	2	2	2	2
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	4,101	3,831	3,650	3,752	3,604	3,460
Rank	6	6	6	5	5	5
Cost per Auto Commuter (\$)	2,323	2,328	2,314	2,276	2,388	2,439
Rank	2	2	2	2	1	2
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	8,996	8,748	8,542	8,478	8,559	8,510
Rank	6	6	6	5	5	5
Annual Gallons of Wasted Fuel (000)	17,781	17,614	17,527	18,265	18,439	18,334
Rank	6	6	6	5	5	5
Annual Congestion Cost (\$ million)	424	382	361	383	361	341
Rank	5	6	6	5	5	5

\* Note: Zeroes in the table reflect values less than 0.5.

# Mobility Data for San Francisco-Oakland CA

Inventory Measures	2005	2004	2003	2002	2001	2000
<b>Urban Area Information</b>						
Population (1000s)	3,320	3,330	3,350	3,370	3,380	3,350
Rank	12	12	12	12	12	12
Commuters (1000s)	1,202	1,201	1,203	1,194	1,179	1,149
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	28,300	28,100	27,900	27,600	27,200	26,800
Arterial Streets	24,700	24,500	24,300	24,100	24,000	23,800
<b>Cost Components</b>						
Value of Time (\$/hour)	14.58	14.10	13.73	13.43	13.22	12.85
Commercial Cost (\$/hour)	36.51	35.19	33.92	32.69	31.51	30.38
Gasoline (\$/gallon)	2.62	2.28	1.78	1.66	1.93	1.72
Diesel (\$/gallon)	2.93	2.27	1.79	1.58	1.78	1.68
System Performance	2005	2004	2003	2002	2001	2000
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	85,250	83,197	81,526	79,971	79,381	78,057
Rank	5	5	5	5	5	5
Fuel per Peak Auto Commuter (gallons)	32	32	32	30	30	29
Rank	2	1	1	1	1	1
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	199,735	194,924	191,009	187,366	185,983	182,881
Rank	5	5	5	5	4	4
Delay per Auto Commuter (pers-hrs)	83	82	81	81	80	79
Rank	2	2	2	2	2	2
<b>Travel Time Index</b>						
Rank	1.40	1.39	1.38	1.38	1.38	1.38
Rank	2	2	2	2	2	2
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	3,287	3,075	2,896	2,768	2,722	2,590
Rank	5	5	5	5	4	4
Cost per Auto Commuter (\$)	2,484	2,508	2,524	2,529	2,544	2,572
Rank	2	2	1	1	1	1
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	8,389	8,187	8,022	7,869	7,811	7,681
Rank	5	5	5	5	4	4
Annual Gallons of Wasted Fuel (000)	18,073	17,638	17,283	16,954	16,829	16,548
Rank	5	5	5	5	5	5
Annual Congestion Cost (\$ million)	322	293	270	252	246	232
Rank	5	5	5	5	4	4

\* Note: Zeroes in the table reflect values less than 0.5.

# Mobility Data for San Francisco-Oakland CA

Inventory Measures	1999	1998	1997	1996	1995	1994
<b>Urban Area Information</b>						
Population (1000s)	3,340	3,320	3,310	3,300	3,290	3,280
Rank	12	12	12	11	10	10
Commuters (1000s)	1,130	1,107	1,087	1,066	1,046	1,030
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	26,600	26,200	25,900	25,700	25,200	24,900
Arterial Streets	23,600	23,300	23,100	22,900	22,700	22,400
<b>Cost Components</b>						
Value of Time (\$/hour)	12.43	12.17	11.98	11.71	11.37	11.06
Commercial Cost (\$/hour)	29.28	28.89	28.50	28.12	27.75	27.38
Gasoline (\$/gallon)	1.59	1.27	1.40	1.21	1.27	1.16
Diesel (\$/gallon)	1.50	1.39	1.51	1.24	1.31	1.19
System Performance	1999	1998	1997	1996	1995	1994
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	76,227	74,584	72,363	70,920	68,283	65,669
Rank	4	4	4	4	4	4
Fuel per Peak Auto Commuter (gallons)	29	28	28	28	26	25
Rank	1	1	1	1	1	1
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	178,594	174,745	169,541	166,161	159,983	153,857
Rank	4	4	4	4	4	4
Delay per Auto Commuter (pers-hrs)	78	78	77	76	75	73
Rank	2	2	2	2	2	2
<b>Travel Time Index</b>						
Rank	1.38	1.37	1.37	1.37	1.36	1.35
Rank	2	2	2	2	2	2
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	2,439	2,320	2,227	2,122	1,993	1,862
Rank	4	4	4	4	4	4
Cost per Auto Commuter (\$)	2,595	2,599	2,560	2,571	2,551	2,526
Rank	1	1	1	1	1	1
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	7,501	7,339	7,121	6,979	6,719	6,462
Rank	4	4	4	4	4	4
Annual Gallons of Wasted Fuel (000)	16,160	15,812	15,341	15,035	14,476	13,922
Rank	4	4	4	4	4	4
Annual Congestion Cost (\$ million)	217	208	201	191	183	172
Rank	4	4	4	4	4	4

\* Note: Zeroes in the table reflect values less than 0.5.

# Mobility Data for San Francisco-Oakland CA

Inventory Measures	1993	1992	1991	1990	1989	1988
<b>Urban Area Information</b>						
Population (1000s)	3,270	3,270	3,220	3,180	3,150	3,140
Rank	10	10	10	9	9	8
Commuters (1000s)	1,011	995	964	938	921	909
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	24,600	24,000	23,800	23,500	23,000	22,600
Arterial Streets	22,100	21,800	21,400	21,200	20,800	20,300
<b>Cost Components</b>						
Value of Time (\$/hour)	10.78	10.47	10.17	9.75	9.25	8.83
Commercial Cost (\$/hour)	27.02	26.66	26.30	25.95	25.60	25.26
Gasoline (\$/gallon)	1.23	1.28	1.11	1.14	1.14	1.05
Diesel (\$/gallon)	1.26	1.25	1.25	1.19	1.09	1.01
System Performance	1993	1992	1991	1990	1989	1988
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	62,843	60,497	57,634	55,977	54,333	52,710
Rank	4	4	4	4	4	4
Fuel per Peak Auto Commuter (gallons)	24	23	22	22	21	20
Rank	1	1	1	1	1	1
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	147,236	141,739	135,033	131,150	127,298	123,495
Rank	4	4	4	4	4	4
Delay per Auto Commuter (pers-hrs)	72	70	68	68	67	66
Rank	2	2	2	2	2	2
<b>Travel Time Index</b>						
Rank	1.34	1.33	1.32	1.32	1.32	1.31
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	1,745	1,638	1,512	1,415	1,309	1,214
Rank	4	4	4	4	4	4
Cost per Auto Commuter (\$)	2,482	2,463	2,421	2,455	2,520	2,571
Rank	1	1	1	1	1	1
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	6,184	5,953	5,671	5,508	5,347	5,187
Rank	4	4	4	4	4	4
Annual Gallons of Wasted Fuel (000)	13,323	12,825	12,218	11,867	11,519	11,174
Rank	4	4	4	4	4	4
Annual Congestion Cost (\$ million)	163	155	146	140	133	126
Rank	4	4	4	4	4	4

\* Note: Zeroes in the table reflect values less than 0.5.

# Mobility Data for San Francisco-Oakland CA

Inventory Measures	1987	1986	1985	1984	1983	1982
<b>Urban Area Information</b>						
Population (1000s)	3,080	3,020	2,960	2,940	2,920	2,900
Rank	8	8	8	8	8	8
Commuters (1000s)	885	860	834	823	809	795
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	22,200	21,800	21,500	21,000	20,500	20,000
Arterial Streets	20,000	19,600	19,300	19,200	19,000	18,895
<b>Cost Components</b>						
Value of Time (\$/hour)	8.48	8.18	8.03	7.75	7.43	7.20
Commercial Cost (\$/hour)	24.93	24.60	24.27	23.94	23.63	23.31
Gasoline (\$/gallon)	1.05	1.03	1.35	1.36	1.39	1.46
Diesel (\$/gallon)	1.01	0.99	1.29	1.31	1.34	1.40
System Performance	1987	1986	1985	1984	1983	1982
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	51,450	48,788	46,332	42,951	40,072	38,854
Rank	4	4	4	4	4	4
Fuel per Peak Auto Commuter (gallons)	20	19	19	17	16	20
Rank	1	1	1	1	1	1
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	120,544	114,306	108,553	100,631	93,885	91,032
Rank	4	4	4	4	4	4
Delay per Auto Commuter (pers-hrs)	65	63	62	59	56	55
Rank	2	2	1	2	2	2
<b>Travel Time Index</b>						
Rank	1.31	1.30	1.30	1.28	1.26	1.26
Rank	2	2	2	2	2	2
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	1,144	1,049	994	894	805	762
Rank	4	4	4	4	4	4
Cost per Auto Commuter (\$)	2,620	2,581	2,494	2,400	2,339	2,345
Rank	1	1	1	1	1	1
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	5,063	4,801	4,559	4,227	3,943	3,823
Rank	4	4	4	4	4	4
Annual Gallons of Wasted Fuel (000)	10,907	10,343	9,822	9,106	8,495	8,237
Rank	4	4	4	4	4	4
Annual Congestion Cost (\$ million)	122	114	110	101	93	90
Rank	4	4	4	4	4	4

\* Note: Zeroes in the table reflect values less than 0.5.