

Performance Measure Summary - Knoxville TN

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 Knoxville TN

Inventory Measures	2017	2016	2015	2014	2013	2012
Urban Area Information						
Population (1000s)	605	600	600	600	595	590
Rank	71	71	70	69	69	69
Commuters (1000s)	312	310	310	310	313	311
Daily Vehicle-Miles of Travel (1000s)						
Freeway	6,827	6,622	6,563	6,092	5,758	5,405
Arterial Streets	8,907	8,748	8,529	8,089	6,530	6,545
Cost Components						
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)	2.14	2.00	2.06	3.05	3.29	3.32
Diesel (\$/gallon)	2.35	2.13	2.37	3.49	3.78	3.75
System Performance	2017	2016	2015	2014	2013	2012
Congested Travel (% of peak VMT)	13.0	--	--	--	--	--
Congested System (% of lane-miles)	7.9	--	--	--	--	--
Congested Time (number of "Rush Hours")	1.4	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	7,356	7,302	7,224	7,126	6,800	6,770
Rank	67	67	67	67	69	69
Fuel per Peak Auto Commuter (gallons)	18	18	17	18	17	17
Rank	63	60	65	57	64	61
Annual Delay						
Total Delay (1000s of person-hours)	18,020	17,788	17,448	16,914	15,857	15,646
Rank	66	65	65	64	68	67
Delay per Auto Commuter (pers-hrs)	44	42	42	40	38	38
Rank	59	62	61	63	68	65
Travel Time Index						
Rank	1.13	1.13	1.13	1.14	1.14	1.14
Rank	83	83	83	80	78	79
Commuter Stress Index						
Rank	1.13	--	--	--	--	--
Rank	92	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	1.38	--	--	--	--	--
Rank	57	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	363	353	341	337	311	303
Rank	66	65	65	64	69	67
Cost per Auto Commuter (\$)	841	836	815	785	744	743
Rank	48	47	48	48	53	50
Truck Congestion						
Annual Person-Hours of Delay (000)	757	747	733	710	666	657
Rank	66	65	65	64	68	67
Annual Gallons of Wasted Fuel (000)	1,559	1,548	1,532	1,511	1,442	1,435
Rank	67	67	67	67	69	69
Annual Congestion Cost (\$ million)	38	36	34	33	30	28
Rank	66	65	64	64	66	68

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

Mobility Data for Knoxville TN

Inventory Measures	2011	2010	2009	2008	2007	2006
Urban Area Information						
Population (1000s)	585	580	570	555	545	530
Rank	69	69	69	70	71	70
Commuters (1000s)	308	304	297	289	282	273
Daily Vehicle-Miles of Travel (1000s)						
Freeway	5,438	5,395	5,250	5,140	5,170	5,095
Arterial Streets	6,541	6,490	6,200	6,025	6,150	6,200
Cost Components						
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)	3.21	2.58	2.15	3.32	2.98	2.54
Diesel (\$/gallon)	3.57	2.84	2.45	4.03	3.26	2.72
System Performance	2011	2010	2009	2008	2007	2006
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	6,557	6,474	6,315	6,507	6,404	6,157
Rank	69	69	69	70	70	71
Fuel per Peak Auto Commuter (gallons)	16	16	15	16	17	16
Rank	67	68	62	68	61	64
Annual Delay						
Total Delay (1000s of person-hours)	14,880	14,423	13,804	13,548	13,332	12,818
Rank	68	67	69	68	68	68
Delay per Auto Commuter (pers-hrs)	37	36	35	36	36	35
Rank	66	64	68	61	59	62
Travel Time Index						
Rank	1.13	1.13	1.13	1.14	1.14	1.14
Rank	84	83	84	79	80	78
Commuter Stress Index						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	285	265	247	252	236	219
Rank	68	69	69	69	68	68
Cost per Auto Commuter (\$)	729	729	709	690	706	697
Rank	51	52	54	53	57	59
Truck Congestion						
Annual Person-Hours of Delay (000)	625	606	580	569	560	538
Rank	68	67	69	68	68	68
Annual Gallons of Wasted Fuel (000)	1,390	1,373	1,339	1,380	1,358	1,305
Rank	69	69	69	70	70	71
Annual Congestion Cost (\$ million)	29	26	25	26	24	21
Rank	68	69	66	69	68	70

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

Mobility Data for Knoxville TN

Inventory Measures	2005	2004	2003	2002	2001	2000
Urban Area Information						
Population (1000s)	515	500	485	470	450	430
Rank	70	70	70	71	73	73
Commuters (1000s)	263	254	245	234	221	207
Daily Vehicle-Miles of Travel (1000s)						
Freeway	5,130	5,030	4,830	4,650	4,475	4,300
Arterial Streets	6,385	6,370	6,160	5,975	5,775	5,620
Cost Components						
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)	2.24	1.86	1.46	1.32	1.45	1.47
Diesel (\$/gallon)	2.39	1.87	1.44	1.30	1.47	1.42
System Performance	2005	2004	2003	2002	2001	2000
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	5,874	5,744	5,651	5,411	5,071	4,850
Rank	72	71	71	69	69	70
Fuel per Peak Auto Commuter (gallons)	14	14	15	14	13	13
Rank	75	71	58	61	63	56
Annual Delay						
Total Delay (1000s of person-hours)	12,230	11,959	11,765	11,266	10,557	10,099
Rank	70	69	69	69	69	69
Delay per Auto Commuter (pers-hrs)	35	35	36	36	35	36
Rank	59	56	50	45	45	40
Travel Time Index						
Rank	1.14	1.14	1.14	1.14	1.14	1.14
Rank	76	74	71	69	68	65
Commuter Stress Index						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	201	188	178	166	153	143
Rank	70	69	69	69	69	69
Cost per Auto Commuter (\$)	688	696	703	688	654	644
Rank	59	57	53	51	54	56
Truck Congestion						
Annual Person-Hours of Delay (000)	514	502	494	473	443	424
Rank	70	69	69	69	69	69
Annual Gallons of Wasted Fuel (000)	1,245	1,218	1,198	1,147	1,075	1,028
Rank	72	71	71	69	69	70
Annual Congestion Cost (\$ million)	19	18	16	15	14	13
Rank	70	68	69	68	67	67

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

Mobility Data for Knoxville TN

Inventory Measures	1999	1998	1997	1996	1995	1994
Urban Area Information						
Population (1000s)	410	390	370	350	335	325
Rank	75	76	78	79	79	80
Commuters (1000s)	195	183	171	159	150	143
Daily Vehicle-Miles of Travel (1000s)						
Freeway	4,210	4,100	4,000	3,900	3,650	3,500
Arterial Streets	5,500	5,370	5,150	4,900	4,555	4,300
Cost Components						
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)	1.07	1.03	1.13	1.24	1.11	1.03
Diesel (\$/gallon)	1.06	1.11	1.20	1.33	1.21	1.10
System Performance	1999	1998	1997	1996	1995	1994
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	4,546	4,131	3,810	3,466	3,069	2,782
Rank	71	71	71	73	73	73
Fuel per Peak Auto Commuter (gallons)	12	11	10	9	8	8
Rank	64	65	66	69	72	65
Annual Delay						
Total Delay (1000s of person-hours)	9,466	8,601	7,932	7,217	6,391	5,793
Rank	69	71	71	72	72	73
Delay per Auto Commuter (pers-hrs)	36	34	34	33	31	29
Rank	37	40	38	38	41	42
Travel Time Index						
Rank	1.14	1.14	1.13	1.13	1.12	1.11
Rank	61	55	62	50	59	63
Commuter Stress Index						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	128	114	104	93	80	70
Rank	69	71	71	72	72	73
Cost per Auto Commuter (\$)	621	576	544	507	460	432
Rank	59	61	61	64	69	70
Truck Congestion						
Annual Person-Hours of Delay (000)	398	361	333	303	268	243
Rank	69	71	71	72	72	73
Annual Gallons of Wasted Fuel (000)	964	876	808	735	651	590
Rank	71	71	71	73	73	73
Annual Congestion Cost (\$ million)	11	10	9	8	7	6
Rank	68	69	70	72	71	73

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Mobility Data for Knoxville TN

Inventory Measures	1993	1992	1991	1990	1989	1988
Urban Area Information						
Population (1000s)	320	320	320	315	315	315
Rank	80	80	79	79	77	76
Commuters (1000s)	139	137	135	130	130	128
Daily Vehicle-Miles of Travel (1000s)						
Freeway	3,400	3,280	3,150	3,025	2,705	2,520
Arterial Streets	4,090	3,915	3,730	3,610	3,570	3,380
Cost Components						
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)	1.07	1.08	1.11	1.08	1.12	1.03
Diesel (\$/gallon)	1.14	1.18	1.20	1.07	1.02	0.94
System Performance	1993	1992	1991	1990	1989	1988
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	2,469	2,286	2,138	1,926	1,691	1,511
Rank	75	75	74	76	74	74
Fuel per Peak Auto Commuter (gallons)	6	6	6	6	4	4
Rank	76	69	67	60	76	71
Annual Delay						
Total Delay (1000s of person-hours)	5,140	4,760	4,452	4,010	3,521	3,146
Rank	73	74	73	74	74	73
Delay per Auto Commuter (pers-hrs)	26	25	23	22	19	17
Rank	49	45	49	46	55	58
Travel Time Index						
Rank	1.10	1.10	1.09	1.09	1.08	1.07
Rank	67	59	62	56	56	60
Commuter Stress Index						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	61	55	50	43	36	31
Rank	73	73	73	75	74	73
Cost per Auto Commuter (\$)	389	376	358	335	315	297
Rank	75	71	70	71	72	72
Truck Congestion						
Annual Person-Hours of Delay (000)	216	200	187	168	148	132
Rank	73	73	73	74	74	73
Annual Gallons of Wasted Fuel (000)	523	485	453	408	358	320
Rank	75	75	74	76	74	74
Annual Congestion Cost (\$ million)	6	5	5	4	4	3
Rank	72	73	70	71	69	73

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Mobility Data for Knoxville TN

Inventory Measures	1987	1986	1985	1984	1983	1982
Urban Area Information						
Population (1000s)	315	310	310	305	300	300
Rank	76	76	75	75	75	75
Commuters (1000s)	128	124	123	121	118	116
Daily Vehicle-Miles of Travel (1000s)						
Freeway	2,365	2,100	1,920	2,060	2,020	1,980
Arterial Streets	3,210	3,095	2,900	2,800	2,700	2,575
Cost Components						
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)	1.04	1.01	1.32	1.34	1.37	1.43
Diesel (\$/gallon)	0.94	0.92	1.20	1.22	1.24	1.30
System Performance	1987	1986	1985	1984	1983	1982
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	1,383	1,205	1,130	1,044	930	950
Rank	74	73	72	71	72	70
Fuel per Peak Auto Commuter (gallons)	3	3	3	3	2	2
Rank	80	74	66	61	69	55
Annual Delay						
Total Delay (1000s of person-hours)	2,879	2,509	2,352	2,173	1,936	1,978
Rank	74	74	73	71	71	69
Delay per Auto Commuter (pers-hrs)	16	14	13	12	11	12
Rank	55	57	56	56	56	47
Travel Time Index						
Rank	66	57	64	57	55	51
Commuter Stress Index						
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	27	23	22	19	17	17
Rank	74	74	73	71	71	68
Cost per Auto Commuter (\$)	281	254	238	228	218	230
Rank	72	71	69	68	67	61
Truck Congestion						
Annual Person-Hours of Delay (000)	121	105	99	91	81	83
Rank	73	74	73	71	71	69
Annual Gallons of Wasted Fuel (000)	293	255	240	221	197	201
Rank	74	73	72	71	72	70
Annual Congestion Cost (\$ million)	3	3	2	2	2	2
Rank	69	67	73	70	66	65

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