

# Performance Measure Summary - Milwaukee WI

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 Milwaukee WI

Inventory Measures	2017	2016	2015	2014	2013	2012
<b>Urban Area Information</b>						
Population (1000s)	1,410	1,410	1,410	1,410	1,410	1,405
Rank	37	37	37	37	37	37
Commuters (1000s)	689	689	689	689	699	697
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	12,550	12,151	11,983	11,511	11,340	11,195
Arterial Streets	16,089	15,938	14,038	13,630	13,962	14,510
<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)	2.33	2.18	2.33	3.32	3.63	3.60
Diesel (\$/gallon)	2.51	2.32	2.31	3.65	3.91	3.91
System Performance	2017	2016	2015	2014	2013	2012
<b>Congested Travel (% of peak VMT)</b>	18.0	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	7.8	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	2.8	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	20,847	20,729	20,507	20,187	20,099	19,950
Rank	36	36	36	36	36	35
Fuel per Peak Auto Commuter (gallons)	23	23	23	22	22	22
Rank	29	27	25	24	24	21
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	42,146	41,596	40,800	39,470	38,608	37,638
Rank	40	40	39	39	40	39
Delay per Auto Commuter (pers-hrs)	46	44	44	43	41	41
Rank	47	53	49	49	52	50
<b>Travel Time Index</b>						
Rank	1.17	1.17	1.17	1.17	1.17	1.17
Rank	49	49	49	52	51	50
<b>Commuter Stress Index</b>						
Rank	1.18	--	--	--	--	--
Rank	56	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	1.52	--	--	--	--	--
Rank	45	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	862	836	810	802	776	746
Rank	40	39	39	39	39	38
Cost per Auto Commuter (\$)	864	858	838	805	797	786
Rank	46	46	46	46	46	46
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	1,770	1,747	1,714	1,658	1,622	1,581
Rank	40	40	39	39	40	39
Annual Gallons of Wasted Fuel (000)	4,419	4,395	4,348	4,280	4,261	4,229
Rank	36	36	36	36	36	35
Annual Congestion Cost (\$ million)	92	87	81	81	75	72
Rank	39	39	39	38	38	37

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

# Mobility Data for Milwaukee WI

Inventory Measures	2011	2010	2009	2008	2007	2006
<b>Urban Area Information</b>						
Population (1000s)	1,405	1,405	1,400	1,400	1,395	1,395
Rank	36	35	34	34	34	33
Commuters (1000s)	695	693	688	685	682	680
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	11,490	11,459	11,000	10,645	11,055	10,950
Arterial Streets	15,200	15,129	14,800	14,455	14,545	14,520
<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)	3.42	2.71	2.29	3.48	3.08	2.73
Diesel (\$/gallon)	3.71	2.99	2.54	4.15	3.41	2.90
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)	19,748	19,641	19,043	19,823	19,393	19,238
Rank	33	33	33	33	32	32
Fuel per Peak Auto Commuter (gallons)	22	22	20	21	21	22
Rank	18	20	18	24	23	18
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	36,578	36,045	34,294	33,999	33,262	32,996
Rank	38	37	38	38	39	37
Delay per Auto Commuter (pers-hrs)	40	40	38	37	37	36
Rank	49	48	54	54	54	56
<b>Travel Time Index</b>						
Rank	1.16	1.16	1.16	1.17	1.16	1.16
Rank	59	58	58	53	63	62
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	717	673	623	646	602	575
Rank	37	37	37	37	37	36
Cost per Auto Commuter (\$)	788	801	775	761	775	790
Rank	46	46	45	45	46	44
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	1,536	1,514	1,440	1,428	1,397	1,386
Rank	38	37	38	38	39	37
Annual Gallons of Wasted Fuel (000)	4,186	4,164	4,037	4,203	4,111	4,079
Rank	33	33	33	33	32	32
Annual Congestion Cost (\$ million)	76	69	63	69	62	58
Rank	37	37	37	37	37	36

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

# Mobility Data for Milwaukee WI

Inventory Measures	2005	2004	2003	2002	2001	2000
<b>Urban Area Information</b>						
Population (1000s)	1,390	1,390	1,385	1,380	1,370	1,365
Rank	33	33	33	33	33	33
Commuters (1000s)	674	671	664	656	646	639
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	10,750	10,940	10,465	10,000	9,800	9,700
Arterial Streets	14,400	14,800	14,230	13,380	13,365	13,515
<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)	2.37	1.98	1.58	1.46	1.51	1.64
Diesel (\$/gallon)	2.53	1.98	1.53	1.40	1.58	1.57
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)	18,782	18,534	18,139	17,584	17,282	16,638
Rank	32	33	33	33	32	32
Fuel per Peak Auto Commuter (gallons)	20	20	21	19	20	19
Rank	25	21	13	18	11	11
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	32,213	31,787	31,110	30,159	29,641	28,536
Rank	38	37	37	37	36	35
Delay per Auto Commuter (pers-hrs)	36	35	35	34	34	33
Rank	53	56	53	54	51	56
<b>Travel Time Index</b>						
Rank	1.16	1.16	1.16	1.15	1.15	1.15
Rank	61	59	56	61	58	56
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	538	507	477	450	436	410
Rank	37	37	37	35	34	35
Cost per Auto Commuter (\$)	797	813	817	808	806	799
Rank	43	41	40	37	35	32
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	1,353	1,335	1,307	1,267	1,245	1,198
Rank	38	37	37	37	36	35
Annual Gallons of Wasted Fuel (000)	3,982	3,929	3,845	3,728	3,664	3,527
Rank	32	33	33	33	32	32
Annual Congestion Cost (\$ million)	53	49	45	42	40	37
Rank	37	37	35	34	33	33

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

# Mobility Data for Milwaukee WI

Inventory Measures	1999	1998	1997	1996	1995	1994
<b>Urban Area Information</b>						
Population (1000s)	1,330	1,300	1,285	1,270	1,250	1,240
Rank	33	32	32	31	31	31
Commuters (1000s)	618	598	587	575	562	553
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	9,325	8,860	8,750	8,600	8,000	7,600
Arterial Streets	13,405	13,325	13,225	13,205	13,100	12,910
<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)	1.17	1.14	1.19	1.33	1.18	1.09
Diesel (\$/gallon)	1.16	1.16	1.26	1.42	1.26	1.16
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)	16,180	16,103	15,693	15,396	14,349	13,137
Rank	29	28	28	28	28	28
Fuel per Peak Auto Commuter (gallons)	18	18	17	18	17	15
Rank	12	10	9	9	9	9
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	27,750	27,618	26,915	26,406	24,609	22,532
Rank	35	33	33	32	31	31
Delay per Auto Commuter (pers-hrs)	33	34	34	34	32	30
Rank	51	40	38	33	34	38
<b>Travel Time Index</b>						
Rank	1.15	1.15	1.15	1.15	1.14	1.13
Rank	52	44	41	40	41	42
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	379	370	356	344	310	276
Rank	34	33	32	31	31	31
Cost per Auto Commuter (\$)	804	818	808	811	781	736
Rank	29	22	20	20	21	21
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	1,165	1,160	1,130	1,109	1,034	946
Rank	35	33	33	32	31	31
Annual Gallons of Wasted Fuel (000)	3,430	3,414	3,327	3,264	3,042	2,785
Rank	29	28	28	28	28	28
Annual Congestion Cost (\$ million)	34	33	32	32	29	26
Rank	33	33	32	31	31	30

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

# Mobility Data for Milwaukee WI

Inventory Measures	1993	1992	1991	1990	1989	1988
<b>Urban Area Information</b>						
Population (1000s)	1,230	1,230	1,225	1,230	1,225	1,225
Rank	31	28	27	27	26	26
Commuters (1000s)	544	540	533	531	524	519
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	7,500	7,775	7,800	7,615	7,400	7,050
Arterial Streets	12,705	12,550	12,075	11,820	11,480	11,435
<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)	1.12	1.11	1.15	1.11	1.13	1.04
Diesel (\$/gallon)	1.20	1.19	1.25	1.21	1.23	1.13
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)	12,576	12,112	11,624	11,021	10,321	9,654
Rank	28	26	25	23	21	22
Fuel per Peak Auto Commuter (gallons)	15	14	14	13	12	12
Rank	9	8	8	8	8	8
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	21,568	20,774	19,936	18,901	17,701	16,557
Rank	30	30	29	28	27	26
Delay per Auto Commuter (pers-hrs)	29	28	27	26	24	23
Rank	33	32	30	27	29	28
<b>Travel Time Index</b>						
Rank	39	37	38	34	36	40
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	259	242	227	207	185	166
Rank	30	30	30	28	26	26
Cost per Auto Commuter (\$)	723	719	710	703	696	686
Rank	20	20	20	19	19	18
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	906	872	837	794	743	695
Rank	30	30	29	28	27	26
Annual Gallons of Wasted Fuel (000)	2,666	2,568	2,464	2,336	2,188	2,047
Rank	28	26	25	23	21	22
Annual Congestion Cost (\$ million)	25	23	22	21	19	18
Rank	30	30	29	26	26	26

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

# Mobility Data for Milwaukee WI

Inventory Measures	1987	1986	1985	1984	1983	1982
<b>Urban Area Information</b>						
Population (1000s)	1,220	1,215	1,210	1,210	1,210	1,210
Rank	26	25	25	25	25	25
Commuters (1000s)	512	506	500	494	490	486
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	6,775	6,315	6,090	5,815	5,385	5,250
Arterial Streets	10,945	10,905	10,440	9,415	9,090	9,065
<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	1.02	1.34	1.35	1.38	1.44
Diesel (\$/gallon)	1.14	1.11	1.45	1.47	1.50	1.57
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)	8,981	8,001	6,902	5,705	5,281	5,034
Rank	21	22	23	24	24	23
Fuel per Peak Auto Commuter (gallons)	11	10	10	6	6	2
Rank	8	9	8	20	13	55
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	15,404	13,723	11,838	9,785	9,057	8,634
Rank	26	26	26	27	27	27
Delay per Auto Commuter (pers-hrs)	21	19	17	14	13	13
Rank	31	35	38	48	49	44
<b>Travel Time Index</b>						
Rank	36	38	39	51	46	43
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	149	128	111	89	80	74
Rank	26	26	26	27	27	27
Cost per Auto Commuter (\$)	664	615	542	460	448	442
Rank	18	18	18	24	23	22
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	647	576	497	411	380	363
Rank	26	26	26	27	27	27
Annual Gallons of Wasted Fuel (000)	1,904	1,696	1,463	1,210	1,120	1,067
Rank	21	22	23	24	24	23
Annual Congestion Cost (\$ million)	16	14	13	10	10	9
Rank	26	26	25	27	26	25

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