

# Performance Measure Summary - New Haven CT

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 New Haven CT

Inventory Measures	2017	2016	2015	2014	2013	2012
<b>Urban Area Information</b>						
Population (1000s)	555	555	555	560	560	560
Rank	76	75	75	75	74	74
Commuters (1000s)	263	263	263	265	270	270
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	7,695	7,593	7,604	7,421	7,697	7,465
Arterial Streets	4,182	4,154	4,121	4,171	4,005	4,075
<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)	2.48	2.29	2.48	3.65	3.82	3.78
Diesel (\$/gallon)	2.66	2.50	2.87	3.87	4.20	4.15
System Performance	2017	2016	2015	2014	2013	2012
<b>Congested Travel (% of peak VMT)</b>	14.0	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	1.5	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	1.0	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	6,379	6,291	6,228	6,137	6,103	6,060
Rank	75	75	75	75	75	75
Fuel per Peak Auto Commuter (gallons)	18	18	18	18	18	18
Rank	63	60	58	57	54	52
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	15,574	15,212	14,932	14,460	14,126	13,778
Rank	74	74	73	74	72	72
Delay per Auto Commuter (pers-hrs)	45	44	44	43	43	42
Rank	55	53	49	49	46	46
<b>Travel Time Index</b>						
Rank	1.16	1.16	1.16	1.16	1.16	1.16
Rank	61	61	60	61	58	60
<b>Commuter Stress Index</b>						
Rank	1.17	--	--	--	--	--
Rank	66	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	1.30	--	--	--	--	--
Rank	70	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	316	304	295	291	281	270
Rank	74	73	73	73	72	72
Cost per Auto Commuter (\$)	767	754	736	710	701	691
Rank	63	64	61	62	61	60
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	654	639	627	607	593	579
Rank	74	74	73	74	72	72
Annual Gallons of Wasted Fuel (000)	1,352	1,334	1,320	1,301	1,294	1,285
Rank	75	75	75	75	75	75
Annual Congestion Cost (\$ million)	34	31	30	29	27	25
Rank	72	73	71	72	72	72

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

# Mobility Data for New Haven CT

Inventory Measures	2011	2010	2009	2008	2007	2006
<b>Urban Area Information</b>						
Population (1000s)	560	555	555	550	550	545
Rank	72	72	71	71	70	69
Commuters (1000s)	270	266	266	262	261	257
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	7,860	7,873	7,700	7,500	7,565	7,480
Arterial Streets	4,018	4,025	4,074	4,200	4,240	4,295
<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)	3.59	2.91	2.41	3.55	3.23	2.83
Diesel (\$/gallon)	3.90	3.20	2.88	4.46	3.66	2.99
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)	6,048	6,031	5,970	6,398	6,269	6,131
Rank	74	73	73	72	72	72
Fuel per Peak Auto Commuter (gallons)	18	18	17	19	19	18
Rank	49	46	43	37	40	47
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	13,500	13,337	12,955	13,222	12,956	12,672
Rank	72	72	72	70	70	70
Delay per Auto Commuter (pers-hrs)	40	40	39	38	39	38
Rank	49	48	47	47	44	45
<b>Travel Time Index</b>						
Rank	1.16	1.16	1.16	1.17	1.17	1.17
Rank	59	58	58	53	56	53
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	261	247	234	247	232	218
Rank	72	72	71	70	69	70
Cost per Auto Commuter (\$)	700	712	703	711	724	731
Rank	58	56	55	50	50	48
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	567	560	544	555	544	532
Rank	72	72	72	70	70	70
Annual Gallons of Wasted Fuel (000)	1,282	1,279	1,266	1,356	1,329	1,300
Rank	74	73	73	72	72	72
Annual Congestion Cost (\$ million)	27	25	24	26	24	22
Rank	72	70	70	69	68	65

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

# Mobility Data for New Haven CT

Inventory Measures	2005	2004	2003	2002	2001	2000
<b>Urban Area Information</b>						
Population (1000s)	545	540	535	535	530	525
Rank	68	68	68	67	67	67
Commuters (1000s)	255	251	248	245	239	234
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	7,465	7,310	7,450	7,505	7,200	6,800
Arterial Streets	4,310	4,310	4,270	4,145	3,705	3,695
<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)	2.35	2.08	1.60	1.46	1.77	1.70
Diesel (\$/gallon)	2.65	2.11	1.68	1.42	1.60	1.58
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)	6,033	5,937	5,793	5,729	5,475	5,246
Rank	71	69	68	67	66	66
Fuel per Peak Auto Commuter (gallons)	18	18	18	19	18	18
Rank	43	38	30	18	23	16
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	12,468	12,270	11,974	11,840	11,315	10,842
Rank	68	67	67	64	65	65
Delay per Auto Commuter (pers-hrs)	38	38	37	37	36	36
Rank	46	42	45	42	43	40
<b>Travel Time Index</b>						
Rank	1.17	1.17	1.16	1.16	1.16	1.16
Rank	50	47	56	54	51	45
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	205	194	182	175	166	154
Rank	69	67	66	64	65	65
Cost per Auto Commuter (\$)	740	755	756	763	740	730
Rank	48	47	44	42	42	40
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	524	515	503	497	475	455
Rank	68	67	67	64	65	65
Annual Gallons of Wasted Fuel (000)	1,279	1,259	1,228	1,215	1,161	1,112
Rank	71	69	68	67	66	66
Annual Congestion Cost (\$ million)	20	19	17	16	15	14
Rank	68	63	64	61	62	63

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

# Mobility Data for New Haven CT

Inventory Measures	1999	1998	1997	1996	1995	1994
<b>Urban Area Information</b>						
Population (1000s)	520	515	505	495	485	475
Rank	67	65	65	66	68	68
Commuters (1000s)	229	224	217	210	203	197
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	6,400	6,000	5,500	5,000	4,830	4,700
Arterial Streets	3,685	3,390	3,240	3,105	3,030	2,920
<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)	1.24	1.22	1.39	1.47	1.34	1.18
Diesel (\$/gallon)	1.16	1.19	1.30	1.41	1.29	1.13
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)	5,034	4,761	4,293	4,038	3,823	3,565
Rank	64	64	65	65	64	65
Fuel per Peak Auto Commuter (gallons)	17	17	15	14	13	12
Rank	17	13	17	18	19	21
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	10,404	9,839	8,873	8,346	7,901	7,368
Rank	66	65	66	64	64	64
Delay per Auto Commuter (pers-hrs)	35	34	33	32	31	30
Rank	41	40	45	43	41	38
<b>Travel Time Index</b>						
Rank	1.15	1.15	1.14	1.13	1.13	1.12
Rank	52	44	47	50	47	51
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	141	131	117	108	99	90
Rank	66	63	65	64	64	64
Cost per Auto Commuter (\$)	724	697	639	613	603	580
Rank	39	39	44	45	40	41
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	437	413	373	351	332	309
Rank	66	65	65	64	64	64
Annual Gallons of Wasted Fuel (000)	1,067	1,009	910	856	810	756
Rank	64	64	65	65	64	65
Annual Congestion Cost (\$ million)	12	12	11	10	9	8
Rank	66	62	62	63	64	64

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

# Mobility Data for New Haven CT

Inventory Measures	1993	1992	1991	1990	1989	1988
<b>Urban Area Information</b>						
Population (1000s)	465	460	455	455	450	445
Rank	68	68	67	67	66	66
Commuters (1000s)	190	186	181	179	175	172
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	4,605	4,460	4,285	4,320	4,300	4,185
Arterial Streets	2,810	2,680	2,520	2,495	2,480	2,480
<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	1.26	1.23	1.12	1.21	1.12
Diesel (\$/gallon)	1.18	1.25	1.38	1.20	1.23	1.14
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)	3,228	2,868	2,649	2,458	2,203	2,051
Rank	67	68	68	65	66	66
Fuel per Peak Auto Commuter (gallons)	11	10	9	9	8	6
Rank	22	24	27	23	26	45
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	6,671	5,928	5,474	5,080	4,552	4,239
Rank	67	67	68	68	67	66
Delay per Auto Commuter (pers-hrs)	28	25	24	22	20	19
Rank	40	45	43	46	48	49
<b>Travel Time Index</b>						
Rank	54	59	51	56	56	48
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	79	69	62	55	47	42
Rank	67	67	67	67	67	66
Cost per Auto Commuter (\$)	537	493	466	456	431	423
Rank	43	46	47	44	47	44
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	280	249	230	213	191	178
Rank	67	67	68	68	67	66
Annual Gallons of Wasted Fuel (000)	684	608	561	521	467	435
Rank	67	68	68	65	66	66
Annual Congestion Cost (\$ million)	7	7	6	5	5	4
Rank	67	63	64	67	60	64

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

# Mobility Data for New Haven CT

Inventory Measures	1987	1986	1985	1984	1983	1982
<b>Urban Area Information</b>						
Population (1000s)	445	440	440	435	435	430
Rank	66	65	65	64	64	64
Commuters (1000s)	171	168	167	163	162	158
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	4,030	3,750	3,515	3,265	3,100	3,250
Arterial Streets	2,470	2,470	2,470	2,200	2,195	2,155
<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)	1.12	1.09	1.43	1.44	1.48	1.55
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)	1,963	1,790	1,591	1,206	1,022	992
Rank	65	64	65	69	70	68
Fuel per Peak Auto Commuter (gallons)	7	7	7	5	3	2
Rank	22	21	15	27	46	55
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	4,056	3,700	3,288	2,492	2,112	2,050
Rank	64	65	65	69	69	68
Delay per Auto Commuter (pers-hrs)	19	17	15	12	10	10
Rank	43	47	50	56	64	58
<b>Travel Time Index</b>						
Rank	44	49	54	57	68	61
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	39	34	31	22	18	17
Rank	64	64	65	69	69	68
Cost per Auto Commuter (\$)	423	398	355	287	245	247
Rank	37	39	43	57	62	59
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	170	155	138	105	89	86
Rank	64	65	65	69	69	68
Annual Gallons of Wasted Fuel (000)	416	380	337	256	217	210
Rank	65	64	65	69	70	68
Annual Congestion Cost (\$ million)	4	4	3	3	2	2
Rank	63	58	65	61	66	65

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