

## Performance Measure Summary - Houston TX

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2014. 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 overnight speeds 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 2014 (estimated at \$17.67 per hour of person travel and \$94.04 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.

### The Mobility Data for Houston TX

Inventory Measures	2014	2013	2012	2011	2010
<b>Urban Area Information</b>					
Population (1000s)	5,000	4,950	4,900	4,830	4,750
Rank	7	7	7	7	7
Commuters (1000s)	2,408	2,384	2,404	2,370	2,373
<b>Daily Vehicle-Miles of Travel (1000s)</b>					
Freeway	51,673	51,518	53,620	54,700	54,300
Arterial Streets	39,211	38,480	40,705	40,768	39,587
<b>Cost Components</b>					
Value of Time (\$/hour)	17.67	17.39	17.14	16.79	16.30
Commercial Cost (\$/hour)	94.04	89.60	89.56	86.81	88.12
Gasoline (\$/gallon)	3.12	3.37	3.33	3.29	2.56
Diesel (\$/gallon)	3.47	3.76	3.75	3.56	2.83
System Performance	2014	2013	2012	2011	2010
<b>Congested Travel (% of peak VMT)</b>	44	--	--	--	--
<b>Congested System (% of lane-miles)</b>	31	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	5.70	--	--	--	--
<b>Annual Excess Fuel Consumed</b>					
Total Fuel (1000 gallons)	94,300	92,053	87,701	80,314	76,689
Rank	4	4	5	6	7
Fuel per Peak Auto Commuter (gallons)	29	28	27	24	23
Rank	5	6	7	11	10
<b>Annual Delay</b>					
Total Delay (1000s of person-hours)	203,173	198,332	188,957	173,040	165,230
Rank	5	5	6	6	7
Delay per Peak Auto Commuter (pers-hrs)	61	61	58	54	51
Rank	8	8	8	10	10
<b>Travel Time Index</b>					
	1.33	1.33	1.31	1.29	1.28
Rank	10	10	11	13	14
<b>Commuter Stress Index</b>					
	1.39	1.39	1.37	1.35	1.34
Rank	12	12	14	16	17
<b>Freeway Planning Time Index (95th Pctile)</b>					
	3.13	--	--	--	--
Rank	12	--	--	--	--
<b>Congestion Cost (constant 2014 \$)</b>					
Total Cost (\$ millions)	4,924	4,884	4,722	4,413	4,347
Rank	4	4	4	6	6
Cost per Peak Auto Commuter (\$)	1,490	1,478	1,429	1,335	1,315
Rank	6	6	7	8	9

\* Note: Cells containing "--" indicate no available data.

### The Mobility Data for Houston TX

Inventory Measures	2009	2008	2007	2006	2005
<b>Urban Area Information</b>					
Population (1000s)	4,700	4,590	4,475	4,400	4,325
Rank	7	7	7	7	7
Commuters (1000s)	2,348	2,313	2,275	2,237	2,218
<b>Daily Vehicle-Miles of Travel (1000s)</b>					
Freeway	54,290	54,020	55,000	53,500	52,600
Arterial Streets	39,195	39,000	41,500	41,000	39,355
<b>Cost Components</b>					
Value of Time (\$/hour)	16.01	16.10	15.47	15.06	14.58
Commercial Cost (\$/hour)	89.75	81.52	82.56	80.43	78.05
Gasoline (\$/gallon)	2.13	3.36	2.92	2.55	2.23
Diesel (\$/gallon)	2.43	4.07	3.30	2.73	2.40
System Performance	2009	2008	2007	2006	2005
<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)	76,047	76,060	75,323	74,594	71,389
Rank	7	7	9	9	8
Fuel per Peak Auto Commuter (gallons)	23	23	23	23	22
Rank	8	12	12	10	11
<b>Annual Delay</b>					
Total Delay (1000s of person-hours)	163,847	163,876	162,288	160,717	153,810
Rank	6	7	8	9	9
Delay per Peak Auto Commuter (pers-hrs)	51	52	53	53	52
Rank	10	14	13	13	13
<b>Travel Time Index</b>					
	1.28	1.28	1.29	1.29	1.28
Rank	14	18	16	14	17
<b>Commuter Stress Index</b>					
	1.34	1.34	1.35	1.35	1.34
Rank	17	17	16	16	16
<b>Freeway Planning Time Index (95th Pctile)</b>					
	--	--	--	--	--
Rank	--	--	--	--	--
<b>Congestion Cost (constant 2014 \$)</b>					
Total Cost (\$ millions)	4,383	4,367	4,491	4,569	4,518
Rank	6	6	7	7	8
Cost per Peak Auto Commuter (\$)	1,326	1,321	1,359	1,382	1,367
Rank	8	10	10	10	12

\* Note: Cells containing "--" indicate no available data.

### The Mobility Data for Houston TX

Inventory Measures	2004	2003	2002	2001	2000
<b>Urban Area Information</b>					
Population (1000s)	4,240	4,165	4,100	3,970	3,800
Rank	8	8	8	9	10
Commuters (1000s)	2,182	2,133	2,085	2,008	1,912
<b>Daily Vehicle-Miles of Travel (1000s)</b>					
Freeway	51,000	49,800	48,900	47,000	45,000
Arterial Streets	39,330	39,540	39,980	39,210	37,085
<b>Cost Components</b>					
Value of Time (\$/hour)	14.10	13.73	13.43	13.22	12.85
Commercial Cost (\$/hour)	74.17	72.23	70.86	71.38	70.47
Gasoline (\$/gallon)	1.83	1.45	1.32	1.46	1.47
Diesel (\$/gallon)	1.85	1.43	1.29	1.48	1.42
System Performance	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)	67,121	65,067	61,135	57,333	51,616
Rank	8	8	9	10	11
Fuel per Peak Auto Commuter (gallons)	20	20	18	17	16
Rank	14	12	19	20	23
<b>Annual Delay</b>					
Total Delay (1000s of person-hours)	144,616	140,189	131,719	123,527	111,210
Rank	9	9	10	12	12
Delay per Peak Auto Commuter (pers-hrs)	49	49	47	46	43
Rank	17	14	16	16	19
<b>Travel Time Index</b>					
	1.27	1.27	1.25	1.25	1.23
Rank	20	15	19	18	22
<b>Commuter Stress Index</b>					
	1.33	1.32	1.31	1.30	1.29
Rank	16	17	20	21	23
<b>Freeway Planning Time Index (95th Pctile)</b>					
	--	--	--	--	--
Rank	--	--	--	--	--
<b>Congestion Cost (constant 2014 \$)</b>					
Total Cost (\$ millions)	4,392	4,371	4,201	4,002	3,705
Rank	9	8	8	9	11
Cost per Peak Auto Commuter (\$)	1,329	1,322	1,271	1,211	1,121
Rank	11	12	12	12	19

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### The Mobility Data for Houston TX

Inventory Measures	1999	1998	1997	1996	1995
<b>Urban Area Information</b>					
Population (1000s)	3,685	3,515	3,385	3,275	3,150
Rank	11	11	11	12	12
Commuters (1000s)	1,841	1,746	1,673	1,610	1,540
<b>Daily Vehicle-Miles of Travel (1000s)</b>					
Freeway	43,200	42,000	40,500	39,000	37,500
Arterial Streets	35,770	33,665	31,965	28,345	26,785
<b>Cost Components</b>					
Value of Time (\$/hour)	12.43	12.17	11.98	11.71	11.37
Commercial Cost (\$/hour)	66.76	65.76	66.83	66.20	64.27
Gasoline (\$/gallon)	1.07	1.01	1.12	1.21	1.14
Diesel (\$/gallon)	1.07	1.10	1.19	1.29	1.21
System Performance	1999	1998	1997	1996	1995
<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)	48,815	46,100	44,101	41,778	39,785
Rank	11	11	11	11	11
Fuel per Peak Auto Commuter (gallons)	15	14	13	13	12
Rank	26	27	27	17	20
<b>Annual Delay</b>					
Total Delay (1000s of person-hours)	105,174	99,325	95,017	90,012	85,720
Rank	12	12	12	12	12
Delay per Peak Auto Commuter (pers-hrs)	42	42	42	41	41
Rank	18	15	14	12	12
<b>Travel Time Index</b>					
	1.23	1.23	1.23	1.22	1.22
Rank	22	20	15	17	13
<b>Commuter Stress Index</b>					
	1.28	1.28	1.28	1.28	1.28
Rank	23	22	21	18	18
<b>Freeway Planning Time Index (95th Pctile)</b>					
	--	--	--	--	--
Rank	--	--	--	--	--
<b>Congestion Cost (constant 2014 \$)</b>					
Total Cost (\$ millions)	3,622	3,496	3,396	3,291	3,227
Rank	11	11	11	11	10
Cost per Peak Auto Commuter (\$)	1,096	1,058	1,028	996	976
Rank	22	22	20	17	17

\* Note: Cells containing "--" indicate no available data.

### The Mobility Data for Houston TX

Inventory Measures	1994	1993	1992	1991	1990
<b>Urban Area Information</b>					
Population (1000s)	3,045	2,930	2,850	2,775	2,700
Rank	12	12	12	12	12
Commuters (1000s)	1,478	1,414	1,368	1,324	1,281
<b>Daily Vehicle-Miles of Travel (1000s)</b>					
Freeway	35,900	34,000	32,800	31,600	30,000
Arterial Streets	25,805	25,260	23,565	23,675	22,480
<b>Cost Components</b>					
Value of Time (\$/hour)	11.06	10.78	10.47	10.17	9.75
Commercial Cost (\$/hour)	62.23	60.84	59.01	57.31	55.03
Gasoline (\$/gallon)	1.03	1.10	1.09	1.12	1.04
Diesel (\$/gallon)	1.09	1.17	1.17	1.20	1.07
System Performance	1994	1993	1992	1991	1990
<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)	37,432	35,792	34,557	33,873	32,558
Rank	11	11	11	11	11
Fuel per Peak Auto Commuter (gallons)	11	11	10	10	10
Rank	20	15	16	15	13
<b>Annual Delay</b>					
Total Delay (1000s of person-hours)	80,649	77,116	74,455	72,981	70,147
Rank	11	11	11	10	10
Delay per Peak Auto Commuter (pers-hrs)	40	40	40	40	40
Rank	12	12	11	11	9
<b>Travel Time Index</b>					
	1.22	1.22	1.22	1.22	1.22
Rank	11	7	6	6	5
<b>Commuter Stress Index</b>					
	1.27	1.27	1.27	1.27	1.27
Rank	16	14	12	12	12
<b>Freeway Planning Time Index (95th Pctile)</b>					
	--	--	--	--	--
Rank	--	--	--	--	--
<b>Congestion Cost (constant 2014 \$)</b>					
Total Cost (\$ millions)	3,122	3,062	3,045	3,074	3,079
Rank	11	10	10	9	9
Cost per Peak Auto Commuter (\$)	945	926	921	930	932
Rank	17	15	13	11	11

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### The Mobility Data for Houston TX

Inventory Measures	1989	1988	1987	1986	1985
<b>Urban Area Information</b>					
Population (1000s)	2,650	2,600	2,550	2,525	2,475
Rank	12	12	12	12	12
Commuters (1000s)	1,248	1,213	1,181	1,160	1,128
<b>Daily Vehicle-Miles of Travel (1000s)</b>					
Freeway	28,310	27,280	25,635	24,680	23,135
Arterial Streets	22,255	21,535	20,285	20,370	20,690
<b>Cost Components</b>					
Value of Time (\$/hour)	9.25	8.83	8.48	8.18	8.03
Commercial Cost (\$/hour)	52.81	50.04	48.53	46.57	47.83
Gasoline (\$/gallon)	1.07	0.99	0.99	0.97	1.27
Diesel (\$/gallon)	1.05	0.97	0.97	0.95	1.24
System Performance	1989	1988	1987	1986	1985
<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)	31,834	31,097	31,482	32,577	33,355
Rank	10	9	8	6	5
Fuel per Peak Auto Commuter (gallons)	10	9	10	10	10
Rank	9	12	8	8	8
<b>Annual Delay</b>					
Total Delay (1000s of person-hours)	68,588	66,999	67,829	70,188	71,865
Rank	10	10	8	6	6
Delay per Peak Auto Commuter (pers-hrs)	40	40	41	43	46
Rank	8	7	4	4	3
<b>Travel Time Index</b>					
	1.22	1.22	1.22	1.24	1.25
Rank	4	4	4	3	3
<b>Commuter Stress Index</b>					
	1.27	1.27	1.28	1.29	1.30
Rank	10	10	7	6	4
<b>Freeway Planning Time Index (95th Pctile)</b>					
	--	--	--	--	--
Rank	--	--	--	--	--
<b>Congestion Cost (constant 2014 \$)</b>					
Total Cost (\$ millions)	3,173	3,249	3,426	3,674	3,832
Rank	8	8	6	5	5
Cost per Peak Auto Commuter (\$)	960	983	1,036	1,112	1,159
Rank	11	10	9	8	8

\* Note: Cells containing "--" indicate no available data.

### The Mobility Data for Houston TX

Inventory Measures	1984	1983	1982
<b>Urban Area Information</b>			
Population (1000s)	2,450	2,420	2,400
Rank	11	11	11
Commuters (1000s)	1,106	1,084	1,066
<b>Daily Vehicle-Miles of Travel (1000s)</b>			
Freeway	23,280	21,930	20,000
Arterial Streets	20,705	19,870	19,335
<b>Cost Components</b>			
Value of Time (\$/hour)	7.75	7.43	7.20
Commercial Cost (\$/hour)	46.47	44.23	43.08
Gasoline (\$/gallon)	1.28	1.31	1.37
Diesel (\$/gallon)	1.25	1.28	1.34
System Performance	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)	33,684	30,867	29,123
Rank	5	5	5
Fuel per Peak Auto Commuter (gallons)	10	9	9
Rank	7	7	8
<b>Annual Delay</b>			
Total Delay (1000s of person-hours)	72,573	66,505	62,747
Rank	5	5	6
Delay per Peak Auto Commuter (pers-hrs)	47	44	42
Rank	3	3	3
<b>Travel Time Index</b>			
	1.25	1.24	1.23
Rank	3	3	3
<b>Commuter Stress Index</b>			
	1.31	1.29	1.28
Rank	3	3	4
<b>Freeway Planning Time Index (95th Pctile)</b>			
	--	--	--
Rank	--	--	--
<b>Congestion Cost (constant 2014 \$)</b>			
Total Cost (\$ millions)	4,007	3,831	3,730
Rank	5	5	5
Cost per Peak Auto Commuter (\$)	1,212	1,159	1,129
Rank	5	6	8

\* Note: Cells containing "--" indicate no available data.