Performance Measure Summary - Charlotte NC-SC

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 Charlotte NC-SC

Inventory Measures	2017	2016	2015	2014	2013	2012
Urban Area Information						
Population (1000s)	1,340	1,295	1,250	1,210	1,170	1,140
Rank	38	38	38	38	40	40
Commuters (1000s)	673	651	627	600	595	579
Daily Vehicle-Miles of Travel (1000s)						
Freeway	16,721	16,175	15,319	14,001	12,416	12,285
Arterial Streets	14,359	13,971	13,952	13,498	10,225	9,770
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 ($/gallon)	2.20	2.10	2.15	3.19	3.44	3.49
Diesel ($/gallon)	2.45	2.23	2.47	3.57	3.89	3.89
System Performance	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**
Congested Travel (% of peak VMT)	24.2	--	--	--	--	--
Congested System (% of lane-miles)	18.0	--	--	--	--	--
Congested Time (number of "Rush Hours")	3.0	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	17,213	16,684	16,201	15,686	15,026	14,455
Rank	39	39	39	40	40	40
Fuel per Peak Auto Commuter (gallons)	22	21	20	19	18	17
Rank	32	37	42	47	54	61
Annual Delay						
Total Delay (1000s of person-hours)	50,641	48,442	46,235	44,377	42,138	39,817
Rank	36	36	37	37	37	37
Delay per Auto Commuter (pers-hrs)	57	54	52	51	50	48
Rank	28	30	31	31	28	29
Travel Time Index	1.22	1.22	1.23	1.23	1.23	1.24
Rank	33	33	29	30	30	26
Commuter Stress Index	1.24	--	--	--	--	--
Rank	36	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)	1.66	--	--	--	--	--
Rank	33	--	--	--	--	--
Congestion Cost						
Total Cost ($ millions)	1,015	956	899	876	819	764
Rank	36	36	37	37	37	37
Cost per Auto Commuter ($)	1,269	1,222	1,160	1,107	1,062	1,016
Rank	19	19	20	21	23	24
Truck Congestion						
Annual Person-Hours of Delay (000)	2,127	2,035	1,942	1,864	1,770	1,672
Rank	36	36	37	37	37	37
Annual Gallons of Wasted Fuel (000)	3,649	3,537	3,435	3,325	3,186	3,064
Rank	39	39	39	40	40	40
Annual Congestion Cost ($ million)	106	97	88	85	76	70
Rank	36	36	37	37	37	38

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

Mobility Data for Charlotte NC-SC

Inventory Measures	2011	2010	2009	2008	2007	2006
Urban Area Information						
Population (1000s)	1,100	1,070	1,045	1,010	990	980
Rank	40	40	41	43	43	43
Commuters (1000s)	558	541	526	507	493	485
Daily Vehicle-Miles of Travel (1000s)						
Freeway	12,797	12,582	12,000	11,620	11,775	11,500
Arterial Streets	10,066	9,897	9,400	9,270	9,420	9,115
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 ($/gallon)	3.32	2.70	2.24	3.42	2.95	2.62
Diesel ($/gallon)	3.64	2.93	2.53	4.11	3.33	2.80
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)	13,883	13,457	13,117	14,093	13,773	13,092
Rank	42	42	42	39	41	42
Fuel per Peak Auto Commuter (gallons)	17	15	14	16	17	16
Rank	60	73	71	68	61	64
Annual Delay						
Total Delay (1000s of person-hours)	37,553	35,734	34,180	34,975	34,180	32,489
Rank	37	39	39	37	37	39
Delay per Auto Commuter (pers-hrs)	46	45	44	47	47	45
Rank	30	30	28	21	24	27
Travel Time Index	1.24	1.24	1.24	1.25	1.25	1.24
Rank	25	24	24	24	27	27
Commuter Stress Index	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost ($ millions)	713	650	607	641	598	549
Rank	38	40	39	38	38	39
Cost per Auto Commuter ($)	990	971	946	957	973	950
Rank	24	26	26	23	24	26
Truck Congestion						
Annual Person-Hours of Delay (000)	1,577	1,501	1,436	1,469	1,436	1,365
Rank	37	39	39	37	37	38
Annual Gallons of Wasted Fuel (000)	2,943	2,853	2,781	2,988	2,920	2,775
Rank	42	42	42	39	41	42
Annual Congestion Cost ($ million)	72	64	60	65	59	53
Rank	39	40	40	38	38	39

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

Mobility Data for Charlotte NC-SC

Inventory Measures	2005	2004	2003	2002	2001	2000
Urban Area Information						
Population (1000s)	965	955	940	910	865	830
Rank	45	44	42	43	45	46
Commuters (1000s)	474	467	457	436	407	385
Daily Vehicle-Miles of Travel (1000s)						
Freeway	10,985	10,000	9,200	8,700	8,100	7,640
Arterial Streets	9,015	8,700	8,300	7,990	7,480	7,000
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 ($/gallon)	2.27	1.89	1.46	1.33	1.43	1.46
Diesel ($/gallon)	2.44	1.90	1.47	1.32	1.47	1.44
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)	12,334	12,006	11,560	10,837	9,693	8,835
Rank	44	45	45	45	46	49
Fuel per Peak Auto Commuter (gallons)	14	15	14	13	12	11
Rank	75	65	69	71	74	74
Annual Delay						
Total Delay (1000s of person-hours)	30,609	29,794	28,687	26,893	24,055	21,924
Rank	39	39	39	39	40	41
Delay per Auto Commuter (pers-hrs)	44	43	42	41	39	38
Rank	27	28	28	28	32	34
Travel Time Index	1.23	1.23	1.23	1.22	1.21	1.20
Rank	28	29	28	29	29	29
Commuter Stress Index	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost ($ millions)	497	464	430	393	347	307
Rank	39	39	39	39	40	43
Cost per Auto Commuter ($)	926	932	921	883	798	748
Rank	27	27	26	31	36	37
Truck Congestion						
Annual Person-Hours of Delay (000)	1,286	1,251	1,205	1,129	1,010	921
Rank	39	39	39	39	40	41
Annual Gallons of Wasted Fuel (000)	2,615	2,545	2,451	2,297	2,055	1,873
Rank	44	45	45	45	46	49
Annual Congestion Cost ($ million)	48	43	39	35	31	27
Rank	39	39	39	39	40	44

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

Mobility Data for Charlotte NC-SC

Inventory Measures	1999	1998	1997	1996	1995	1994
Urban Area Information						
Population (1000s)	785	755	720	685	660	635
Rank	47	48	49	50	50	53
Commuters (1000s)	358	339	318	298	282	267
Daily Vehicle-Miles of Travel (1000s)						
Freeway	7,000	6,380	6,200	5,200	4,485	4,095
Arterial Streets	6,510	6,000	5,455	5,120	4,960	4,875
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 ($/gallon)	1.05	1.02	1.14	1.21	1.13	1.02
Diesel ($/gallon)	1.06	1.12	1.20	1.28	1.19	1.08
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)	7,929	7,216	6,619	6,056	5,534	5,122
Rank	51	51	52	52	52	52
Fuel per Peak Auto Commuter (gallons)	10	9	9	8	6	6
Rank	77	79	75	76	85	84
Annual Delay						
Total Delay (1000s of person-hours)	19,678	17,908	16,426	15,028	13,732	12,712
Rank	45	44	45	45	45	45
Delay per Auto Commuter (pers-hrs)	36	35	34	33	32	31
Rank	37	37	38	38	34	31
Travel Time Index	1.20	1.19	1.18	1.18	1.17	1.17
Rank	26	27	28	26	29	26
Commuter Stress Index	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost ($ millions)	264	235	213	192	170	153
Rank	45	45	45	45	45	45
Cost per Auto Commuter ($)	694	647	603	564	532	506
Rank	45	49	51	52	54	54
Truck Congestion						
Annual Person-Hours of Delay (000)	826	752	690	631	577	534
Rank	45	44	45	45	45	45
Annual Gallons of Wasted Fuel (000)	1,681	1,530	1,403	1,284	1,173	1,086
Rank	51	51	52	52	52	52
Annual Congestion Cost ($ million)	23	21	19	17	15	14
Rank	46	44	45	45	46	44

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Mobility Data for Charlotte NC-SC

Inventory Measures	1993	1992	1991	1990	1989	1988
Urban Area Information						
Population (1000s)	620	600	560	540	530	520
Rank	52	54	56	57	56	56
Commuters (1000s)	257	245	224	213	208	202
Daily Vehicle-Miles of Travel (1000s)						
Freeway	3,700	3,300	2,800	2,650	2,270	1,915
Arterial Streets	4,795	4,700	4,605	4,500	4,390	4,300
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 ($/gallon)	1.07	1.08	1.12	1.08	1.08	1.00
Diesel ($/gallon)	1.13	1.15	1.21	1.07	0.98	0.91
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)	4,789	4,419	4,007	3,495	3,140	2,832
Rank	52	52	52	56	56	56
Fuel per Peak Auto Commuter (gallons)	5	6	6	4	4	3
Rank	82	69	67	81	76	81
Annual Delay						
Total Delay (1000s of person-hours)	11,884	10,967	9,944	8,674	7,792	7,027
Rank	47	46	47	48	48	48
Delay per Auto Commuter (pers-hrs)	30	29	28	26	24	22
Rank	30	28	26	27	29	32
Travel Time Index	1.16	1.15	1.15	1.14	1.13	1.12
Rank	26	26	23	25	27	27
Commuter Stress Index	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost ($ millions)	140	126	111	93	80	69
Rank	47	47	47	48	48	48
Cost per Auto Commuter ($)	486	462	434	394	376	356
Rank	51	53	54	59	61	58
Truck Congestion						
Annual Person-Hours of Delay (000)	499	461	418	364	327	295
Rank	47	46	47	48	48	48
Annual Gallons of Wasted Fuel (000)	1,015	937	849	741	666	600
Rank	52	52	52	56	56	56
Annual Congestion Cost ($ million)	13	12	11	9	8	7
Rank	44	44	44	48	46	48

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

Mobility Data for Charlotte NC-SC

Inventory Measures	1987	1986	1985	1984	1983	1982
Urban Area Information						
Population (1000s)	500	485	445	425	420	415
Rank	59	60	64	65	65	65
Commuters (1000s)	193	185	169	160	157	153
Daily Vehicle-Miles of Travel (1000s)						
Freeway	1,800	1,780	1,650	1,600	1,510	1,410
Arterial Streets	4,220	4,100	4,000	3,700	3,400	3,290
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 ($/gallon)	1.00	0.98	1.28	1.29	1.32	1.38
Diesel ($/gallon)	0.91	0.89	1.16	1.17	1.20	1.26
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)	2,561	2,279	1,953	1,770	1,577	1,407
Rank	56	55	58	59	58	60
Fuel per Peak Auto Commuter (gallons)	3	4	2	2	2	2
Rank	80	54	84	79	69	55
Annual Delay						
Total Delay (1000s of person-hours)	6,355	5,656	4,847	4,392	3,914	3,491
Rank	47	46	50	49	51	52
Delay per Auto Commuter (pers-hrs)	21	19	18	17	16	14
Rank	31	35	35	35	33	40
Travel Time Index	1.11	1.10	1.10	1.09	1.08	1.08
Rank	29	32	26	29	33	28
Commuter Stress Index	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost ($ millions)	60	52	44	39	33	29
Rank	47	46	50	49	51	52
Cost per Auto Commuter ($)	337	307	269	252	235	217
Rank	61	63	65	66	64	67
Truck Congestion						
Annual Person-Hours of Delay (000)	267	238	204	184	164	147
Rank	47	46	50	49	51	52
Annual Gallons of Wasted Fuel (000)	543	483	414	375	334	298
Rank	56	55	58	59	58	60
Annual Congestion Cost ($ million)	6	6	5	4	4	3
Rank	47	45	46	49	47	52

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