#### Performance Measure Summary - San Antonio TX

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2020. 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 2020 (estimated at \$20.17 per hour of person travel and \$55.24 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.

Annual Greenhouse Gases (CO2) Produced -Tons of CO2 produced from all vehicle travel.

Excess Greenhouse Gases (CO2) Produced due to Congestion-Tons of CO2 produced due to congested portion of travel. The excess CO2 is a subset of the total CO2 produced.

Inventory Measures	2020	2019	2018	2017	2016	2015
Urban Area Information						
Population (1000s)	2,030	2,030	2,015	2,000	1,970	1,950
Rank	24	24	24	25	25	26
Commuters (1000s)	1,040	1,040	1,033	1,025	1,010	1,000
Daily Vehicle-Miles of Travel (1000s)						
Freeway	21,522	25,775	25,072	24,890	25,621	24,330
Arterial Streets	15,222	18,230	16,780	16,751	15,129	14,794
Cost Components						
Value of Time (\$/hour)	20.17	19.14	18.71	18.12	17.91	17.69
Commercial Cost (\$/hour)	55.24	61.03	54.71	52.14	50.20	46.87
Gasoline (\$/gallon)	2.05	2.37	2.63	2.17	1.97	2.11
Diesel (\$/gallon)	2.51	2.73	2.99	2.31	2.10	2.36
System Performance	2020	2019	2018	2017	2016	2015
Congested Travel (% of peak VMT)				29.0		
Congested System (% of lane-miles)				18.3		
Congested Time (number of "Rush Hours")				4.1		
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	17,686	28,260	27,193	26,044	25,969	25,815
Rank	19	27	26	27	26	26
Fuel per Peak Auto Commuter (gallons)	15	24	23	22	22	21
Rank	9	27	31	32	33	36
Annual Delay						
Total Delay (1000s of person-hours)	44,999	71,905	70,583	69,982	68,421	66,862
Rank	22	25	27	26	26	26
Delay per Auto Commuter (pers-hrs)	32	52	51	51	50	48
Rank	21	36	34	34	33	35
Travel Time Index	1.12	1.23	1.23	1.23	1.23	1.23
Rank	10	31	32	30	29	29
Commuter Stress Index	1.13	1.31	1.32	1.30		
Rank	14	26	24	23		
Freeway Planning Time Index (95th Pctile)		1.71	1.65	1.74		
Rank		33	34	28		
Congestion Cost						
Total Cost (\$ millions)	1,010	1,584	1,535	1,484	1,427	1,376
Rank	22	26	27	26	26	26
Cost per Auto Commuter (\$)	682	1,069	1,044	1,017	1,001	974
Rank	23	40	38	38	37	36
Truck Congestion						
Annual Person-Hours of Delay (000)	2,270	3,471	3,271	2,939	2,874	2,808
Rank	18	27	27	27	26	26
Annual Gallons of Wasted Fuel (000)	3,820	5,841	5,740	5,521	5,505	5,473
Rank	21	26	26	26	26	26
Annual Congestion Cost (\$ million)	120	204	179	155	146	135
Rank	18	24	27	27	26	26
Annual Greenhouse Gases (CO2) Produced	150050	201.212		ı	ı	
Excess Due to Congestion (tons)	176,051	281,312				
Rank	19	27				
Due to All Travel (tons)	5,873,014	9,384,493				
Rank	15	20				
Truck Annual Greenhouse Gases (CO2) Produced	50.040	77. 501		ı	ı	
Excess Due to Truck Congestion (tons)	50,040	76,521				
Rank	1 660 222	23				
Due to Truck Travel (tons)	1,669,333	2,552,712				
Rank	13	17				

<sup>\*</sup> Note: Zeroes in the table reflect values less than 0.5.

Inventory Measures	2014	2013	2012	2011	2010	2009
Urban Area Information						
Population (1000s)	1,935	1,905	1,870	1,840	1,800	1,800
Rank	26	26	25	24	25	24
Commuters (1000s)	989	993	975	958	933	930
Daily Vehicle-Miles of Travel (1000s)						
Freeway	22,323	21,185	20,645	19,114	18,758	19,200
Arterial Streets	13,970	12,866	13,210	13,345	13,097	12,800
Cost Components	,	,		,		
Value of Time (\$/hour)	17.67	17.39	17.14	16.79	16.28	16.01
Commercial Cost (\$/hour)	44.82	41.23	39.66	44.62	42.50	41.83
Gasoline (\$/gallon)	3.12	3.37	3.33	3.29	2.56	2.13
Diesel (\$/gallon)	3.47	3.76	3.75	3.56	2.83	2.43
System Performance	2014	2013	2012	2011	2010	2009
Congested Travel (% of peak VMT)						
Congested System (% of lane-miles)						
Congested Time (number of "Rush Hours")						
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	25,630	25,471	24,696	23,718	22,875	21,883
Rank	26	26	26	26	26	26
Fuel per Peak Auto Commuter (gallons)	20	21	20	19	18	16
Rank	38	30	33	40	46	54
Annual Delay						
Total Delay (1000s of person-hours)	65,239	63,697	60,658	57,196	54,651	51,304
Rank	26	26	26	26	26	26
Delay per Auto Commuter (pers-hrs)	47	45	44	43	42	41
Rank	34	41	38	38	38	38
Travel Time Index	1.24	1.24	1.24	1.23	1.23	1.22
Rank	26	26	25	28	28	31
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	1,365	1,314	1,233	1,153	1,052	964
Rank	26	26	26	26	26	26
Cost per Auto Commuter (\$)	944	931	897	874	861	822
Rank	35	36	37	39	43	44
Truck Congestion						
Annual Person-Hours of Delay (000)	2,740	2,675	2,548	2,402	2,295	2,155
Rank	25	25	25	25	25	25
Annual Gallons of Wasted Fuel (000)	5,433	5,400	5,236	5,028	4,849	4,639
Rank	26	26	26	26	26	26
Annual Congestion Cost (\$ million)	134	123	114	118	105	95 25
Rank	25	25	25	25	25	25
Annual Greenhouse Gases (CO2) Produced				ı	1	
Excess Due to Congestion (tons)						
Rank						
Due to All Travel (tons)						
Rank						
Truck Annual Greenhouse Gases (CO2) Produced				ı	1	
Excess Due to Truck Congestion (tons)						
Rank						
Due to Truck Travel (tons)						
Rank						

<sup>\*</sup> Note: Zeroes in the table reflect values less than 0.5.

Inventory Measures	2008	2007	2006	2005	2004	2003
Urban Area Information						
Population (1000s)	1,770	1,710	1,670	1,620	1,600	1,550
Rank	26	27	28	28	28	29
Commuters (1000s)	911	874	848	816	802	773
Daily Vehicle-Miles of Travel (1000s)						
Freeway	19,465	19,600	19,300	19,000	18,600	18,000
Arterial Streets	12,650	12,300	12,100	11,400	11,030	10,600
Cost Components						
Value of Time (\$/hour)	16.07	15.47	15.06	14.58	14.10	13.73
Commercial Cost (\$/hour)	40.77	39.30	37.88	36.51	35.19	33.92
Gasoline (\$/gallon)	3.36	2.92	2.55	2.23	1.83	1.45
Diesel (\$/gallon)	4.07	3.30	2.73	2.40	1.85	1.43
System Performance	2008	2007	2006	2005	2004	2003
Congested Travel (% of peak VMT)						
Congested System (% of lane-miles)						
Congested Time (number of "Rush Hours")						
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	22,556	22,330	21,989	20,986	20,566	19,609
Rank	28	29	27	29	27	28
Fuel per Peak Auto Commuter (gallons)	17	17	18	16	16	16
Rank	61	61	47	58	56	49
Annual Delay						
Total Delay (1000s of person-hours)	50,365	49,859	49,099	46,859	45,920	43,785
Rank	26	25	25	27	26	26
Delay per Auto Commuter (pers-hrs)	40	41	42	42	41	41
Rank	38	36	32	31	32	30
Travel Time Index	1.23	1.24	1.24	1.24	1.24	1.23
Rank	30	29	27	27	28	28
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	981	926	880	807	757	695
Rank	27	27	26	27	26	26
Cost per Auto Commuter (\$)	799	822	832	821	831	814
Rank	46	45	45	44	42	42
Truck Congestion						
Annual Person-Hours of Delay (000)	2,115	2,094	2,062	1,968	1,929	1,839
Rank	26	25	25	26	25	25
Annual Gallons of Wasted Fuel (000)	4,782	4,734	4,662	4,449	4,360	4,157
Rank	27	27	27	27	26	27
Annual Congestion Cost (\$ million)	100	93 25	86	78	71	64
Rank	26	25	24	26	25	25
Annual Greenhouse Gases (CO2) Produced				ı	I	
Excess Due to Congestion (tons)						
Rank						
Due to All Travel (tons) Rank						
Truck Annual Greenhouse Gases (CO2) Produced				ı	I	
Excess Due to Truck Congestion (tons)						
Rank Due to Travel (Travel (tons)						
Due to Truck Travel (tons)						
Rank						

<sup>\*</sup> Note: Zeroes in the table reflect values less than 0.5.

Inventory Measures	2002	2001	2000	1999	1998	1997
Urban Area Information						
Population (1000s)	1,500	1,470	1,465	1,450	1,445	1,440
Rank	29	28	28	28	27	26
Commuters (1000s)	737	710	697	678	665	652
Daily Vehicle-Miles of Travel (1000s)						
Freeway	17,650	17,100	16,700	16,200	15,500	15,000
Arterial Streets	10,430	10,340	10,400	9,590	9,495	9,785
Cost Components						
Value of Time (\$/hour)	13.43	13.22	12.85	12.43	12.17	11.98
Commercial Cost (\$/hour)	32.69	31.51	30.38	29.28	28.89	28.50
Gasoline (\$/gallon)	1.32	1.46	1.47	1.07	1.01	1.12
Diesel (\$/gallon)	1.29	1.48	1.42	1.07	1.10	1.19
System Performance	2002	2001	2000	1999	1998	1997
Congested Travel (% of peak VMT)						
Congested System (% of lane-miles)						
Congested Time (number of "Rush Hours")						
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	18,907	18,125	17,278	16,362	15,553	14,899
Rank	27	27	26	27	26	26
Fuel per Peak Auto Commuter (gallons)	15	15	14	13	13	12
Rank	53	47	50	51	42	47
Annual Delay						
Total Delay (1000s of person-hours)	42,217	40,470	38,579	36,533	34,728	33,268
Rank	26	26	24	24	24	24
Delay per Auto Commuter (pers-hrs)	41	41	40	39	38	37
Rank	28	28	28	27	26	22
Travel Time Index	1.24	1.23	1.22	1.22	1.21	1.20
Rank	23	24	24	24	24	24
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	653	618	573	519	483	457
Rank	26	26	26	24	24	25
Cost per Auto Commuter (\$)	802	780	765	747	728	708
Rank	43	43	41	42	40	38
Truck Congestion						
Annual Person-Hours of Delay (000)	1,773	1,700	1,620	1,534	1,459	1,397
Rank	25	25	26	26	26	26
Annual Gallons of Wasted Fuel (000)	4,008	3,842	3,663	3,469	3,297	3,159
Rank	26	27	27	26	26	26
Annual Congestion Cost (\$ million)	59	56	51	45	43	41
Rank	25	26	26	26	26	26
Annual Greenhouse Gases (CO2) Produced				ı	I	
Excess Due to Congestion (tons)						
Rank						
Due to All Travel (tons) Rank						
Truck Annual Greenhouse Gases (CO2) Produced				ı	I	
Excess Due to Truck Congestion (tons)						
Rank Due to Taylok Troyal (tons)						
Due to Truck Travel (tons)						
Rank						

<sup>\*</sup> Note: Zeroes in the table reflect values less than 0.5.

Inventory Measures	1996	1995	1994	1993	1992	1991
Urban Area Information						
Population (1000s)	1,400	1,325	1,275	1,250	1,200	1,180
Rank	27	29	29	29	30	30
Commuters (1000s)	624	581	551	531	502	485
Daily Vehicle-Miles of Travel (1000s)						
Freeway	14,200	13,400	12,200	11,340	10,500	9,700
Arterial Streets	9,410	8,320	9,040	8,720	8,570	8,385
Cost Components						
Value of Time (\$/hour)	11.71	11.37	11.06	10.78	10.47	10.17
Commercial Cost (\$/hour)	28.12	27.75	27.38	27.02	26.66	26.30
Gasoline (\$/gallon)	1.21	1.14	1.03	1.10	1.09	1.12
Diesel (\$/gallon)	1.29	1.21	1.09	1.17	1.17	1.20
System Performance	1996	1995	1994	1993	1992	1991
Congested Travel (% of peak VMT)						
Congested System (% of lane-miles)						
Congested Time (number of "Rush Hours")						
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	13,635	12,181	10,584	9,550	8,433	7,418
Rank	28	30	30	31	31	33
Fuel per Peak Auto Commuter (gallons)	11	10	9	8	7	7
Rank	49	52	56	58	59	57
Annual Delay						
Total Delay (1000s of person-hours)	30,445	27,198	23,633	21,324	18,829	16,563
Rank	25	26	29	30	31	33
Delay per Auto Commuter (pers-hrs)	35	33	30	28	26	24
Rank	25	31	38	40	41	43
Travel Time Index	1.19	1.19	1.17	1.16	1.15	1.13
Rank	25	23	26	26	27	34
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	411	357	301	266	229	196
Rank	25	26	30	30	31	33
Cost per Auto Commuter (\$)	662	611	546	505	462	418
Rank	38	46	51	53	58	62
Truck Congestion						
Annual Person-Hours of Delay (000)	1,279	1,142	993	896	791	696
Rank	26	26	27	28	29	31
Annual Gallons of Wasted Fuel (000)	2,891	2,582	2,244	2,025	1,788	1,573
Rank	26	26	26	27	28	31
Annual Congestion Cost (\$ million)	37	33	28	25	22	19
Rank	26	26	27	27	28	31
Annual Greenhouse Gases (CO2) Produced				1	1	
Excess Due to Congestion (tons)						
Rank						
Due to All Travel (tons)						
Rank						
Truck Annual Greenhouse Gases (CO2) Produced					1	
Excess Due to Truck Congestion (tons)						
Rank						
Due to Truck Travel (tons)  Rank						

<sup>\*</sup> Note: Zeroes in the table reflect values less than 0.5.

Inventory Measures	1990	1989	1988	1987	1986	1985
Urban Area Information						
Population (1000s)	1,170	1,165	1,165	1,050	1,035	1,005
Rank	29	29	28	32	32	33
Commuters (1000s)	473	468	464	415	405	391
Daily Vehicle-Miles of Travel (1000s)						
Freeway	9,280	8,575	8,900	8,770	8,710	8,420
Arterial Streets	7,935	7,720	7,510	7,300	7,255	6,725
Cost Components						
Value of Time (\$/hour)	9.75	9.25	8.83	8.48	8.18	8.03
Commercial Cost (\$/hour)	25.95	25.60	25.26	24.93	24.60	24.27
Gasoline (\$/gallon)	1.04	1.07	0.99	0.99	0.97	1.27
Diesel (\$/gallon)	1.07	1.05	0.97	0.97	0.95	1.24
System Performance	1990	1989	1988	1987	1986	1985
Congested Travel (% of peak VMT)						
Congested System (% of lane-miles)						
Congested Time (number of "Rush Hours")						
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	6,829	6,419	6,042	5,793	5,634	5,137
Rank	33	32	31	28	26	27
Fuel per Peak Auto Commuter (gallons)	5	5	5	4	4	4
Rank	72	63	58	61	54	50
Annual Delay						
Total Delay (1000s of person-hours)	15,248	14,332	13,492	12,936	12,581	11,470
Rank	33	32	29	27	27	26
Delay per Auto Commuter (pers-hrs)	22	21	20	21	21	20
Rank	46	45	44	31	26	25
Travel Time Index	1.12	1.12	1.11	1.12	1.12	1.11
Rank	35	33	33	27	25	25
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	173	155	140	129	122	111
Rank	33	32	29	27	27	26
Cost per Auto Commuter (\$)	401	399	396	396	401	369
Rank	63	59	57	54	47	45
Truck Congestion						
Annual Person-Hours of Delay (000)	640	602	567	543	528	482
Rank	32	31	30	28	27	27
Annual Gallons of Wasted Fuel (000)	1,448	1,361	1,281	1,228	1,194	1,089
Rank	31	29	30	27	26	26
Annual Congestion Cost (\$ million)	17	16	15	14	13	12
Rank	30	30	27	27	27	26
Annual Greenhouse Gases (CO2) Produced						
Excess Due to Congestion (tons)						
Rank						
Due to All Travel (tons)						
Rank						
Truck Annual Greenhouse Gases (CO2) Produced						
Excess Due to Truck Congestion (tons)						
- ' '		ı	I			
Rank						
Rank Due to Truck Travel (tons) Rank		 	 	 	 	

<sup>\*</sup> Note: Zeroes in the table reflect values less than 0.5.

Inventory Measures	1984	1983	1982
Urban Area Information			
Population (1000s)	980	980	960
Rank	34	33	33
Commuters (1000s)	378	376	364
Daily Vehicle-Miles of Travel (1000s)			
Freeway	7,780	7,150	6,835
Arterial Streets	6,505	6,385	6,155
Cost Components			
Value of Time (\$/hour)	7.75	7.43	7.20
Commercial Cost (\$/hour)	23.94	23.63	23.31
Gasoline (\$/gallon)	1.28	1.31	1.37
Diesel (\$/gallon)	1.25	1.28	1.34
System Performance	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)	4,758	4,517	4,205
Rank	26	26	25
Fuel per Peak Auto Commuter (gallons)	4	3	3
Rank	41	46	34
Annual Delay	1		
Total Delay (1000s of person-hours)	10,623	10,086	9,389
Rank	25	25	25
Delay per Auto Commuter (pers-hrs)	19	18	18
Rank	27	25	21
Travel Time Index	1.11	1.10	1.10
Rank	23	23	20
Commuter Stress Index	23	23	20
Rank			
Freeway Planning Time Index (95th Pctile)			
Rank			
Congestion Cost	00	0.1	02
Total Cost (\$ millions)	99	91	83
Rank	25	25	25
Cost per Auto Commuter (\$)  Rank	355	352	338
	41	41	40
Truck Congestion	146	42.4	204
Annual Person-Hours of Delay (000) Rank	446	424	394
	1 000	25	25
Annual Gallons of Wasted Fuel (000)	1,009	958	891
Rank	26	25	25
Annual Congestion Cost (\$ million) Rank	11 25	11 25	10 24
	23	23	
Annual Greenhouse Gases (CO2) Produced			
Excess Due to Congestion (tons)			
Rank			
Due to All Travel (tons) Rank			
Truck Annual Greenhouse Gases (CO2) Produced			
Excess Due to Truck Congestion (tons)			
Rank			
Due to Truck Travel (tons)			
Rank			

<sup>\*</sup> Note: Zeroes in the table reflect values less than 0.5.