#### Performance Measure Summary - San Juan PR

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)	1,975	1,975	1,990	2,010	2,030	2,040
Rank	25	25	25	24	22	21
Commuters (1000s)	998	998	1,006	1,016	1,025	1,031
Daily Vehicle-Miles of Travel (1000s)						
Freeway	9,011	10,012	10,049	10,054	10,100	10,200
Arterial Streets	9,715	10,794	11,085	11,086	11,100	11,100
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)	3.54	3.66	3.84	3.07	2.73	2.90
Diesel (\$/gallon)	4.16	4.26	4.21	4.04	4.06	4.25
System Performance	2020	2019	2018	2017	2016	2015
Congested Travel (% of peak VMT)				34.6		
Congested System (% of lane-miles)				25.7		
Congested Time (number of "Rush Hours")				4.4		
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	14,672	29,219	29,629	30,188	29,880	29,538
Rank	25	25	23	23	23	23
Fuel per Peak Auto Commuter (gallons)	14	28	28	28	28	27
Rank	17	15	14	14	14	14
Annual Delay						
Total Delay (1000s of person-hours)	38,667	77,006	78,005	80,080	77,107	73,245
Rank	25	24	22	22	22	22
Delay per Auto Commuter (pers-hrs)	29	57	57	58	56	55
Rank	29	29	28	24	27	24
Travel Time Index	1.13	1.32	1.32	1.33	1.33	1.33
Rank	6	15	15	14	14	11
Commuter Stress Index	1.17	1.45	1.43	1.56		
Rank	5	7	8	4		
Freeway Planning Time Index (95th Pctile)		2.18	2.25	2.50		
Rank		6	5	4		
Congestion Cost						
Total Cost (\$ millions)	868	1,696	1,704	1,712	1,623	1,526
Rank	25	24	23	22	22	22
Cost per Auto Commuter (\$)	694	1,355	1,351	1,344	1,303	1,230
Rank	17	17	17	17	18	18
Truck Congestion					ĺ	
Annual Person-Hours of Delay (000)	1,239	2,680	2,713	2,715	2,681	2,547
Rank	38	30	29	28	28	28
Annual Gallons of Wasted Fuel (000)	2,033	4,399	4,320	4,272	4,236	4,187
Rank	39	32	32	31	30	30
Annual Congestion Cost (\$ million)	68	164	153	149	143	129
Rank	38	28	28	28	27	27
Annual Greenhouse Gases (CO2) Produced						
Excess Due to Congestion (tons)		289,979				
l n 1	145,607					
Rank	145,607 25	25			I	
Nank Due to All Travel (tons)		25 4,039,341	 			
	25			  		
Due to All Travel (tons)	25 2,028,278	4,039,341		  		
Due to All Travel (tons) Rank	25 2,028,278	4,039,341				 
Due to All Travel (tons)  Rank  Truck Annual Greenhouse Gases (CO2) Produced	25 2,028,278 50	4,039,341 48	 	   		  
Due to All Travel (tons) Rank  Truck Annual Greenhouse Gases (CO2) Produced Excess Due to Truck Congestion (tons)	25 2,028,278 50 22,189	4,039,341 48 48,001		   		   

<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)	2,055	2,075	2,110	2,140	2,130	2,125
Rank	21	21	21	21	21	21
Commuters (1000s)	1,038	1,069	1,087	1,100	1,091	1,085
Daily Vehicle-Miles of Travel (1000s)						
Freeway	10,224	11,160	11,110	12,549	12,426	12,300
Arterial Streets	11,139	12,830	12,770	13,120	12,891	12,372
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)	4.21	4.35	4.11	3.75	3.47	2.87
Diesel (\$/gallon)	4.86	4.91	4.79	4.10	4.04	3.86
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)	29,335	28,969	28,746	28,262	27,758	26,878
Rank	23	23	23	23	24	24
Fuel per Peak Auto Commuter (gallons)	27	26	26	25	26	25
Rank	12	13	12	12	9	7
Annual Delay						
Total Delay (1000s of person-hours)	71,561	69,499	64,908	62,104	59,878	56,896
Rank	22	22	24	23	23	24
Delay per Auto Commuter (pers-hrs)	54	52	48	46	43	41
Rank	23	23	29	30	34	38
Travel Time Index	1.34	1.33	1.32	1.30	1.29	1.28
Rank	7	9	10	13	13	15
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	1,524	1,458	1,343	1,264	1,178	1,089
Rank	22	22	24	24	23	23
Cost per Auto Commuter (\$)	1,195	1,171	1,108	1,094	1,086	1,051
Rank	18	19	22	21	20	21
Truck Congestion						
Annual Person-Hours of Delay (000)	2,488	2,417	2,257	2,160	2,082	1,979
Rank	28	27	28	28	27	27
Annual Gallons of Wasted Fuel (000)	4,158	4,107	4,075	4,006	3,935	3,810
Rank	30	30	30	30	30	30
Annual Congestion Cost (\$ million)	125	113	103	106	99	92
Rank	27	26	27	28	27	27
Annual Greenhouse Gases (CO2) Produced						
Excess Due to Congestion (tons)						
Rank						
Due to All Travel (tons)						
Rank						
Rank						
Rank Truck Annual Greenhouse Gases (CO2) Produced		  		  		  
Rank  Truck Annual Greenhouse Gases (CO2) Produced  Excess Due to Truck Congestion (tons)		  		  		   

<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)	2,120	2,115	2,110	2,100	2,095	2,090
Rank	21	21	21	20	20	19
Commuters (1000s)	1,079	1,068	1,058	1,046	1,037	1,029
Daily Vehicle-Miles of Travel (1000s)						
Freeway	12,200	12,135	12,000	11,845	11,750	11,100
Arterial Streets	12,755	12,810	13,310	13,250	13,430	13,000
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)	3.74	3.41	3.09	2.63	2.38	2.03
Diesel (\$/gallon)	4.34	4.00	3.51	2.93	2.50	1.22
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)	25,783	26,702	27,049	27,029	26,397	25,057
Rank	24	24	22	21	21	21
Fuel per Peak Auto Commuter (gallons)	23	24	25	25	24	24
Rank	13	10	9	8	10	9
Annual Delay						
Total Delay (1000s of person-hours)	51,979	53,833	54,531	54,490	53,217	50,517
Rank	24	24	24	23	23	23
Delay per Auto Commuter (pers-hrs)	39	40	41	41	41	39
Rank	43	41	34	34	32	37
Travel Time Index	1.27	1.27	1.28	1.28	1.28	1.26
Rank	19	19	16	14	14	18
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	1,023	1,014	992	949	891	812
Rank	24	24	24	23	23	23
Cost per Auto Commuter (\$)	951	1,025	1,066	1,101	1,114	1,084
Rank	29	25	19	18	17	18
Truck Congestion						
Annual Person-Hours of Delay (000)	1,808	1,872	1,896	1,895	1,851	1,757
Rank	30	27	27	27	27	27
Annual Gallons of Wasted Fuel (000)	3,655	3,785	3,834	3,832	3,742	3,552
Rank	32	30	28	29	29	29
Annual Congestion Cost (\$ million)	85	84	81	76	70	60
Rank	29	27	27	27	26	27
Annual Greenhouse Gases (CO2) Produced						
Excess Due to Congestion (tons)						
Rank						
Due to All Travel (tons)						
Rank						
Truck Annual Greenhouse Gases (CO2) Produced						
Truck Annual Greenhouse Gases (CO2) Produced  Excess Due to Truck Congestion (tons)  Rank		  		 		
Truck Annual Greenhouse Gases (CO2) Produced Excess Due to Truck Congestion (tons)		  		  		  

<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)	2,085	2,080	2,075	2,065	2,055	2,050
Rank	19	18	18	18	18	18
Commuters (1000s)	1,012	992	975	954	934	917
Daily Vehicle-Miles of Travel (1000s)	,					
Freeway	10,200	9,500	9,000	8,600	8,300	7,700
Arterial Streets	12,300	11,850	11,400	10,900	10,500	10,000
Cost Components	12,500	11,000	11,.00	10,500	10,000	10,000
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)	1.72	2.00	1.86	1.53	1.63	1.67
Diesel (\$/gallon)	2.00	2.12	2.02	1.88	1.83	1.83
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)	22,749	21,112	19,541	17,457	15,386	14,842
Rank	23	24	24	25	27	27
Fuel per Peak Auto Commuter (gallons)	22	19	19	17	13	12
Rank	10	13	11	17	42	47
Annual Delay						
Total Delay (1000s of person-hours)	45,862	42,562	39,396	35,193	31,017	29,922
Rank	23	23	23	27	29	28
Delay per Auto Commuter (pers-hrs)	36	34	31	28	26	25
Rank	45	51	65	72	72	73
Travel Time Index	1.24	1.23	1.21	1.19	1.17	1.17
Rank	23	24	27	30	35	32
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	718	661	593	508	440	419
Rank	23	23	23	27	29	28
Cost per Auto Commuter (\$)	1,006	946	901	833	749	733
Rank	22	23	26	30	35	32
Truck Congestion						
Annual Person-Hours of Delay (000)	1,594	1,480	1,370	1,224	1,078	1,041
Rank	28	29	29	30	32	32
Annual Gallons of Wasted Fuel (000)	3,225	2,992	2,770	2,475	2,181	2,104
Rank	30	31	31	32	33	33
Annual Congestion Cost (\$ million)	55	50	44	38	33	31
Rank	28	29	29	29	31	31
Annual Greenhouse Gases (CO2) Produced	20	2)	27	2)	31	31
Excess Due to Congestion (tons)				1	I	
Rank						
Due to All Travel (tons)						
Rank						
Truck Annual Greenhouse Gases (CO2) Produced					ı	
Excess Due to Truck Congestion (tons)						
= D 1						
Rank						
Rank 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)	2,040	2,030	2,010	1,940	1,900	1,860
Rank	18	18	18	19	19	19
Commuters (1000s)	898	879	858	814	785	755
Daily Vehicle-Miles of Travel (1000s)						
Freeway	7,400	7,050	6,800	6,450	6,250	6,000
Arterial Streets	9,750	9,300	8,850	8,200	7,750	7,100
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)	1.68	1.57	1.52	1.50	1.47	1.46
Diesel (\$/gallon)	1.88	1.75	1.70	1.68	1.69	1.68
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)	14,719	14,209	13,035	10,972	10,157	9,181
Rank	26	24	24	29	29	29
Fuel per Peak Auto Commuter (gallons)	12	13	13	10	9	9
Rank	38	19	15	38	45	27
Annual Delay						
Total Delay (1000s of person-hours)	29,674	28,645	26,277	22,120	20,475	18,508
Rank	26	25	25	28	27	30
Delay per Auto Commuter (pers-hrs)	25	24	22	19	19	17
Rank	70	70	72	78	74	78
Travel Time Index	1.17	1.17	1.16	1.14	1.13	1.12
Rank	30	29	30	36	38	39
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	407	381	340	280	252	222
Rank	26	25	25	26	27	30
Cost per Auto Commuter (\$)	747	742	700	605	579	540
Rank	29	26	29	33	33	42
Truck Congestion						
Annual Person-Hours of Delay (000)	1,032	996	913	769	712	644
Rank	31	30	31	33	32	33
Annual Gallons of Wasted Fuel (000)	2,086	2,014	1,848	1,555	1,439	1,301
Rank	32	32	33	35	34	34
Annual Congestion Cost (\$ million)	31	29	26	22	20	18
Rank	30	29	29	32	32	32
Annual Greenhouse Gases (CO2) Produced						
Excess Due to Congestion (tons)						
Rank						
Due to All Travel (tons)						
=						
Rank						
Truck Annual Greenhouse Gases (CO2) Produced						
Truck Annual Greenhouse Gases (CO2) Produced  Excess Due to Truck Congestion (tons)  Rank		 	 	 	 	
Truck Annual Greenhouse Gases (CO2) Produced Excess Due to Truck Congestion (tons)		  		   	  	  

<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)	1,810	1,750	1,700	1,660	1,615	1,580
Rank	19	21	21	21	21	21
Commuters (1000s)	723	695	669	648	625	607
Daily Vehicle-Miles of Travel (1000s)						
Freeway	5,850	5,620	5,425	5,200	5,000	4,800
Arterial Streets	6,800	6,300	5,900	5,400	5,000	4,500
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)	1.36	1.36	1.26	1.26	1.23	1.61
Diesel (\$/gallon)	1.57	1.57	1.45	1.45	1.42	1.85
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)	8,483	7,568	6,205	5,476	4,868	4,669
Rank	29	29	30	32	30	29
Fuel per Peak Auto Commuter (gallons)	8	7	6	5	4	5
Rank	35	39	45	48	54	32
Annual Delay						
Total Delay (1000s of person-hours)	17,101	15,257	12,509	11,041	9,813	9,414
Rank	29	30	33	30	31	30
Delay per Auto Commuter (pers-hrs)	17	15	13	12	11	11
Rank	70	77	80	79	78	72
Travel Time Index	1.12	1.11	1.09	1.09	1.08	1.08
Rank	35	37	44	41	43	40
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	196	167	131	112	96	92
Rank	29	29	32	30	31	29
Cost per Auto Commuter (\$)	520	492	424	390	361	351
Rank	38	40	52	56	57	53
Truck Congestion						
Annual Person-Hours of Delay (000)	595	531	435	384	341	327
Rank	34	34	36	36	37	36
Annual Gallons of Wasted Fuel (000)	1,202	1,073	880	776	690	662
Rank	34	35	37	38	40	38
Annual Congestion Cost (\$ million)	16	14	12	10	9	9
Rank	33	34	34	36	34	31
Annual Greenhouse Gases (CO2) Produced					1	
Excess Due to Congestion (tons)						
Rank						
Due to All Travel (tons)						
Rank						
Truck Annual Greenhouse Gases (CO2) Produced						
E D t- T ( (+)		I				
Excess Due to Truck Congestion (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)	1,550	1,510	1,490
Rank	21	21	20
Commuters (1000s)	591	572	558
Daily Vehicle-Miles of Travel (1000s)			
Freeway	4,500	4,300	4,100
Arterial Streets	4,100	3,800	3,500
Cost Components	,	,	,
Value of Time (\$/hour)	7.75	7.43	7.20
Commercial Cost (\$/hour)	23.94	23.63	23.31
Gasoline (\$/gallon)	1.62	1.66	1.74
Diesel (\$\(\frac{9}{gallon}\)	1.87	1.92	2.00
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)	4,041	3,823	3,035
Rank	31	31	36
Fuel per Peak Auto Commuter (gallons)	3	4	2
Rank	61	35	55
Annual Delay			
Total Delay (1000s of person-hours)	8,146	7,709	6,119
Rank	31	31	35
Delay per Auto Commuter (pers-hrs)	10	9	8
Rank	70	70	73
Travel Time Index	1.07	1.07	1.05
Rank	42	40	51
Commuter Stress Index			
Rank			
Freeway Planning Time Index (95th Pctile)			
Rank			
Congestion Cost			
Total Cost (\$ millions)	78	71	55
Rank	30	30	35
Cost per Auto Commuter (\$)	315	311	254
Rank	53	51	60
Truck Congestion			
Annual Person-Hours of Delay (000)	283	268	213
Rank	37	36	42
Annual Gallons of Wasted Fuel (000)	573	542	430
Rank	373	38	430
Annual Congestion Cost (\$ million)	7	7	5
Rank	35	32	40
	33	32	40
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.