#### Performance Measure Summary - Kansas City MO-KS

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)	1,605	1,605	1,605	1,605	1,605	1,600
Rank	34	34	34	33	32	32
Commuters (1000s)	834	834	834	834	834	831
Daily Vehicle-Miles of Travel (1000s)						
Freeway	20,759	24,422	24,439	24,488	23,969	23,249
Arterial Streets	11,889	13,987	13,929	13,778	13,904	13,394
Cost Components	11,005	10,507	15,525	15,776	15,501	10,00
Value of Time (\$/hour)	20.17	19.14	18.71	18.12	17.91	17.69
Commercial Cost (\$/hour)	55.24	49.49	54.71	52.14	50.20	46.87
Gasoline (\$/gallon)	2.09	2.37	2.62	2.16	1.98	2.08
Diesel (\$/gallon)	2.49	2.69	3.01	2.31	2.11	2.31
· •						
System Performance	2020	2019	2018	2017	2016	2015
Congested Travel (% of peak VMT)				17.6		
Congested System (% of lane-miles)				11.1		
Congested Time (number of "Rush Hours")				2.3		
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	14,325	20,971	19,863	19,224	19,082	18,985
Rank	26	35	35	37	37	35
Fuel per Peak Auto Commuter (gallons)	11	16	15	15	15	15
Rank	51	81	86	84	83	83
Annual Delay						
Total Delay (1000s of person-hours)	35,061	51,326	49,564	48,328	47,659	47,011
Rank	27	34	35	35	35	34
Delay per Auto Commuter (pers-hrs)	34	50	48	47	47	45
Rank	16	41	43	46	43	45
Travel Time Index	1.10	1.16	1.16	1.15	1.15	1.15
Rank	29	59	57	69	69	67
Commuter Stress Index	1.11	1.17	1.17	1.16		
Rank	31	67	67	72		
Freeway Planning Time Index (95th Pctile)		1.37	1.34	1.37		
Rank		58	60	59		
Congestion Cost						
Total Cost (\$ millions)	812	1,125	1,089	1,033	996	969
Rank	27	34	35	35	35	34
Cost per Auto Commuter (\$)	694	961	930	883	878	861
Rank	17	47	48	50	48	47
Truck Congestion						
Annual Person-Hours of Delay (000)	2,582	3,187	2,587	2,230	2,002	1,974
Rank	16	28	30	34	38	37
Annual Gallons of Wasted Fuel (000)	4,364	5,387	4,797	4,376	4,045	4,025
Rank	17	28	30	30	32	32
Annual Congestion Cost (\$ million)	136	155	143	118	102	95
Rank	17	29	30	34	37	36
Annual Greenhouse Gases (CO2) Produced						
Excess Due to Congestion (tons)	144,969	212,223				
Rank	26	35				
Due to All Travel (tons)	5,302,779	7,762,822				
Rank	17	25				
Truck Annual Greenhouse Gases (CO2) Produced	- /					
Excess Due to Truck Congestion (tons)	48,243	59,549				
Rank	18	27				
Due to Truck Travel (tons)	1,768,012	2,182,376				
Rank	1,700,012	18				
1XMIIX	11	10				

<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)	1,600	1,600	1,595	1,585	1,575	1,550
Rank	32	31	31	31	31	31
Commuters (1000s)	831	839	840	837	829	813
Daily Vehicle-Miles of Travel (1000s)						
Freeway	22,532	22,187	21,315	21,701	21,564	21,300
Arterial Streets	12,850	12,773	12,755	12,242	12,500	12,779
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)	3.16	3.36	3.30	3.24	2.49	2.09
Diesel (\$/gallon)	3.47	3.67	3.69	3.54	2.77	2.33
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)	18,820	18,574	18,331	18,088	17,733	17,177
Rank	35	36	36	35	36	36
Fuel per Peak Auto Commuter (gallons)	18	18	18	18	18	17
Rank	57	54	52	49	46	43
Annual Delay						
Total Delay (1000s of person-hours)	45,800	44,406	43,434	42,088	40,503	38,500
Rank	34	34	34	34	33	33
Delay per Auto Commuter (pers-hrs)	44	43	42	41	40	39
Rank	44	46	46	45	48	47
Travel Time Index	1.15	1.15	1.15	1.15	1.14	1.14
Rank	68	68	69	67	71	72
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	962	919	885	850	781	724
Rank	34	34	34	34	33	33
Cost per Auto Commuter (\$)	833	816	809	807	802	776
Rank	47	47	47	47	48	48
Truck Congestion						
Annual Person-Hours of Delay (000)	1,924	1,865	1,824	1,768	1,701	1,617
Rank	35	37	35	35	34	35
Annual Gallons of Wasted Fuel (000)	3,990	3,938	3,886	3,835	3,759	3,642
Rank	32	32	32	32	32	32
Annual Congestion Cost (\$ million) Rank	94   35	86 35	82 35	87   34	78   35	72 35
	33	33	33	34	33	33
Annual Greenhouse Gases (CO2) Produced				ı	I	
Excess Due to Congestion (tons)  Rank						
Nank Due to All Travel (tons)						
Rank				<u></u>		 -
Truck Annual Greenhouse Gases (CO2) Produced				ı	I	
Excess Due to Truck Congestion (tons)						
Rank Due to Truck Travel (tons)						
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)	1,530	1,525	1,520	1,500	1,500	1,500
Rank	31	31	31	31	31	31
Commuters (1000s)	800	792	783	768	763	759
Daily Vehicle-Miles of Travel (1000s)						
Freeway	21,050	21,015	20,820	20,675	20,185	20,185
Arterial Streets	13,000	13,315	13,000	12,970	12,970	12,980
Cost Components	13,000	13,313	13,000	12,770	12,770	12,700
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)	3.31	2.85	2.54	2.20	1.78	1.43
Diesel (\$/gallon)	4.01	3.22	2.72	2.36	1.80	1.43
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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)	17,689	17,048	16,829	16,668	16,470	15,570
Rank	35	36	35	36	35	35
Fuel per Peak Auto Commuter (gallons)	18	17	16	16	17	15
Rank	49	61	64	58	46	58
Annual Delay						
Total Delay (1000s of person-hours)	37,760	36,391	35,925	35,580	35,157	33,238
Rank	33	33	33	34	32	32
Delay per Auto Commuter (pers-hrs)	38	37	37	37	37	35
Rank	47	54	52	48	47	53
Travel Time Index	1.15	1.14	1.14	1.14	1.14	1.14
Rank	69	77	75	73	71	69
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	738	677	645	614	580	528
Rank	34	34	33	34	33	33
Cost per Auto Commuter (\$)	753	755	766	784	802	780
Rank	49	53	52	47	45	47
Truck Congestion						
Annual Person-Hours of Delay (000)	1,586	1,528	1,509	1,494	1,477	1,396
Rank	35	37	37	36	34	35
Annual Gallons of Wasted Fuel (000)	3,750	3,614	3,568	3,534	3,492	3,301
Rank	30	31	30	30	30	30
Annual Congestion Cost (\$ million)	76	68	63	59	55	49
Rank	36	36	36	35	35	34
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.

Inventory Measures	2002	2001	2000	1999	1998	1997
Urban Area Information						
Population (1000s)	1,475	1,425	1,420	1,390	1,375	1,355
Rank	31	32	31	30	30	30
Commuters (1000s)	736	699	686	660	642	623
Daily Vehicle-Miles of Travel (1000s)					-	
Freeway	20,070	19,350	19,310	18,790	18,225	17,310
Arterial Streets	12,890	12,840	12,725	12,705	12,610	12,600
Cost Components	12,070	12,0.0	12,720	12,700	12,010	12,000
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)	1.30	1.33	1.48	1.02	1.01	1.06
Diesel (\$/gallon)	1.25	1.40	1.41	1.02	1.04	1.15
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)	15,148	14,349	13,713	13,562	12,604	11,826
Rank	34	34	34	33	33	33
Fuel per Peak Auto Commuter (gallons)	16	15	13	14	13	13
Rank	42	47	56	42	42	38
Annual Delay						
Total Delay (1000s of person-hours)	32,336	30,630	29,273	28,949	26,905	25,244
Rank	33	33	34	33	34	34
Delay per Auto Commuter (pers-hrs)	35	35	34	34	33	31
Rank	51	45	49	45	46	49
Travel Time Index	1.14	1.13	1.13	1.13	1.13	1.12
Rank	68	73	72	70	63	67
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	501	467	436	411	375	347
Rank	33	33	33	33	33	35
Cost per Auto Commuter (\$)	772	744	730	746	708	675
Rank	47	46	49	43	44	42
Truck Congestion						
Annual Person-Hours of Delay (000)	1,358	1,286	1,229	1,216	1,130	1,060
Rank	33	32	31	31	31	31
Annual Gallons of Wasted Fuel (000)	3,211	3,042	2,907	2,875	2,672	2,507
Rank	31	30	30	30	30	30
Annual Congestion Cost (\$ million)	45	42	39	36	33	31
Rank	32	31	31	31	31	31
Annual Greenhouse Gases (CO2) Produced						
Excess Due to Congestion (tons)	'					
Rank						
Due to All Travel (tons)		 	 	 	 	
Due to All Travel (tons)	 	 		  		  
Due to All Travel (tons) Rank	 	 		  		  
Due to All Travel (tons)  Rank  Truck Annual Greenhouse Gases (CO2) Produced	  	 		   		  
Due to All Travel (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	1996	1995	1994	1993	1992	1991
Urban Area Information						
Population (1000s)	1,340	1,330	1,320	1,300	1,200	1,160
Rank	30	27	27	27	30	32
Commuters (1000s)	606	592	579	560	509	484
Daily Vehicle-Miles of Travel (1000s)						
Freeway	16,940	15,960	15,260	14,900	13,240	12,520
Arterial Streets	12,585	12,510	12,365	12,050	11,730	11,185
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)	1.22	1.04	0.95	0.98	0.96	1.01
Diesel (\$/gallon)	1.34	1.14	1.04	1.08	1.08	1.09
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)	11,143	10,765	10,396	9,754	8,788	8,148
Rank	32	31	31	30	30	30
Fuel per Peak Auto Commuter (gallons)	11	11	11	11	10	8
Rank	49	41	37	22	24	45
Annual Delay						
Total Delay (1000s of person-hours)	23,786	22,980	22,191	20,821	18,760	17,392
Rank	34	32	31	31	32	31
Delay per Auto Commuter (pers-hrs)	30	30	29	28	28	27
Rank	49	46	42	40	32	30
Travel Time Index	1.12	1.11	1.11	1.11	1.11	1.10
Rank	65	66	60	52	49	51
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost						
Total Cost (\$ millions)	322	301	282	259	227	205
Rank	34	33	31	31	32	31
Cost per Auto Commuter (\$)	651	649	647	621	577	552
Rank	43	36	32	31	35	31
Truck Congestion						== -
Annual Person-Hours of Delay (000)	999	965	932	874	788	730
Rank	32	32	30	30	30	1 727
Annual Gallons of Wasted Fuel (000)	2,362	2,282	2,204	2,068	1,863	1,727
Rank	31	27	27	26	27	27
Annual Congestion Cost (\$ million) Rank	29 32	28 31	26 29	24   29	22 28	20 28
	32	31	29	29	28	28
Annual Greenhouse Gases (CO2) Produced				ı	I	
Excess Due to Congestion (tons)  Rank						
Nank Due to All Travel (tons)	 					
Rank			 	<u></u>		 -
Truck Annual Greenhouse Gases (CO2) Produced				ı	I	
Excess Due to Truck Congestion (tons)						
Rank Due to Truck Travel (tons)						
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)	1,160	1,155	1,145	1,140	1,135	1,130
Rank	30	30	29	28	28	28
Commuters (1000s)	476	471	463	458	451	446
Daily Vehicle-Miles of Travel (1000s)						
Freeway	12,555	12,370	12,220	11,920	10,905	10,190
Arterial Streets	10,615	10,100	9,535	8,820	8,215	7,530
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)	0.98	1.11	1.02	1.03	1.00	1.31
Diesel (\$/gallon)	0.98	1.04	0.96	0.96	0.94	1.23
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)	7,698	7,021	6,403	5,715	4,763	4,064
Rank	30	30	29	29	31	33
Fuel per Peak Auto Commuter (gallons)	9	8	7	7	6	5
Rank	23	26	27	22	28	32
Annual Delay						
Total Delay (1000s of person-hours)	16,432	14,987	13,668	12,199	10,168	8,675
Rank	31	31	28	29	29	31
Delay per Auto Commuter (pers-hrs)	26	24	22	20	17	14
Rank	27	29	32	36	47	54
Travel Time Index	1.10	1.09	1.08	1.08	1.06	1.06
Rank	47	49	49	45	56	53
Commuter Stress Index						
Rank						
Freeway Planning Time Index (95th Pctile)						
Rank						
Congestion Cost	100	1.0		122		2.4
Total Cost (\$ millions)	186	163	142	122	99	84
Rank	31	31	27	28	29	31
Cost per Auto Commuter (\$)  Rank	544 31	524 33	503 36	470 34	408 42	352 52
	31	33	30	34	42	32
Truck Congestion	(00	(20	571	510	427	264
Annual Person-Hours of Delay (000) Rank	690	629 30	574 29	512 29	427 30	364 31
Annual Gallons of Wasted Fuel (000)	1,632	1,488	1,357	1,212	1,010	862
Rank	27	27	27	29	30	32
Annual Congestion Cost (\$ million)	18	17	15	13	11	9
Rank	28	28	27	29	30	31
Annual Greenhouse Gases (CO2) Produced		20	2,		50	31
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		<u></u>		<u></u>		
Due to Truck Travel (tons)						
Rank						
1 cm in						

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

Inventory Measures	1984	1983	1982
Urban Area Information			
Population (1000s)	1,100	1,095	1,090
Rank	29	29	29
Commuters (1000s)	431	426	419
Daily Vehicle-Miles of Travel (1000s)			
Freeway	9,380	8,985	8,425
Arterial Streets	6,720	6,010	5,520
Cost Components			
Value of Time (\$/hour)	7.75	7.43	7.20
Commercial Cost (\$/hour)	23.94	23.63	23.31
Gasoline (\$/gallon)	1.33	1.36	1.42
Diesel (\$/gallon)	1.24	1.27	1.33
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)	3,460	3,253	2,960
Rank	36	36	37
Fuel per Peak Auto Commuter (gallons)	3	3	3
Rank	61	46	34
Annual Delay			
Total Delay (1000s of person-hours)	7,387	6,943	6,319
Rank	36	33	33
Delay per Auto Commuter (pers-hrs)	13	12	11
Rank	52	51	53
Travel Time Index	1.05	1.05	1.04
Rank	57	55	61
Commuter Stress Index			
Rank			
Freeway Planning Time Index (95th Pctile)			
Rank			
Congestion Cost			
Total Cost (\$ millions)	70	63	56
Rank	37	33	33
Cost per Auto Commuter (\$)	314	305	286
Rank	54	54	51
Truck Congestion			
Annual Person-Hours of Delay (000)	310	292	265
Rank	32	32	32
Annual Gallons of Wasted Fuel (000)	734	690	628
Rank	33	32	32
Annual Congestion Cost (\$ million)	8	7	7
Rank	32	32	30
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)			

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