

## Performance Measure Summary

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2005. There is no single performance measure that experts agree “says it all.” The best comparison of congestion levels and trends is done between regions of similar size, over several years, and with a few measures of congestion aspects. 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. A few key points should be recognized by users of the Urban Mobility Report data.

**Use the Trends** – The multi-year performance measures are better indicators, in most cases, than 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 the top of a few 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*).

### Comparison of Several Key Mobility Performance Measures Medium Group – 500,000 to 1 million population urban areas

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2005	
				Delay per Traveler	Total Delay
Jacksonville, FL	H+	H+	H+	F	F+
Nashville-Davidson, TN	H+	0	H+	0	F+
Salt Lake City, UT	0	H	H	0	F+
Raleigh-Durham, NC	H+	H	H+	F+	F+
Richmond, VA	L-	L-	0	S-	S
Louisville, KY-IN	H+	H+	H+	F+	F+
Hartford, CT	L-	L-	L	S	S-
Bridgeport-Stamford, CT-NY	H	H+	H+	F	F+
Charlotte, NC-SC	H+	H+	H+	F+	F+
Austin, TX	H+	H+	H+	F+	F+
Oklahoma City, OK	L-	L-	L	S	S-
Tulsa, OK	L-	L-	L	S-	S-
Tucson, AZ	H+	H+	H+	0	F+
Dayton, OH	L-	L-	L-	S-	S-
Honolulu, HI	L	H+	L	S-	S-
Birmingham, AL	H+	0	H	F+	F+
El Paso, TX-NM	L	0	L	F	S-
Rochester, NY	L-	L-	L-	S-	S-
Springfield, MA-CT	L-	L-	L-	S-	S-
Omaha, NE-IA	L	0	L	0	S-
Sarasota-Bradenton, FL	L	H	L	S-	S-
Allentown-Bethlehem, PA-NJ	L-	L	L-	S-	S-
Akron, OH	L-	L-	L-	S-	S-
Fresno, CA	L-	L	L-	S-	S-
Grand Rapids, MI	L	L-	L-	0	S-
Oxnard-Ventura, CA	H+	H+	0	F+	F+
Albuquerque, NM	H+	0	0	F	S
New Haven, CT	L-	L-	L-	S-	S-
<b>Albany-Schenectady, NY</b>	<b>L-</b>	<b>L-</b>	<b>L-</b>	<b>S-</b>	<b>S-</b>
Toledo, OH-MI	L-	L-	L-	S-	S-

0 – Average congestion levels or average congestion growth

H Higher congestion; H+ Much higher congestion; F Faster congestion growth; F+ Much faster growth

L Lower congestion; L- Much lower congestion; S Slower congestion growth; S- Much slower growth

## Performance Measures and Definition of Terms

**Travel Time Index** – A measure of congestion that focuses on each trip and each mile of travel. The ratio of travel time in the peak period to travel time in free-flow. A value of 1.30 indicates a 20-minute free-flow trip takes 26 minutes in the peak.

**Peak Travelers** – Number of travelers (using any travel mode) who begin a trip during the morning or evening peak travel periods (6 to 9 a.m. and 4 to 7 p.m.).

**Annual Delay per Traveler** – A yearly sum of all the per-trip delays. This measure illustrates the effect of the per-mile congestion as well as the length of each trip. The extra time required to travel in the peak period is divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.).

**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** (60 mph on freeways and 35 mph on arterials) – These values are used as the national comparison thresholds. Other speed values may be appropriate for urban areas or sub-regions.

**Excess Fuel Consumed** – Increased fuel consumption due to travel in congested conditions rather than free-flow conditions.

**Public Transportation** – Regular route service from all public transportation providers in an urban area.

**Operations Treatments** – Freeway incident management, freeway ramp metering, arterial street signal coordination and arterial street access management.

**Congestion Cost** – Value of travel delay for 2005 (estimated at \$14.60 per hour of person travel and \$77.10 per hour of truck time) and excess fuel consumption (estimated using state average cost per gallon).

**Annual Increase Needed to Maintain Constant Congestion Level** – Number of lane-miles that must be added to the road system each year – or – the number of new transit riders or carpoolers that must be added to keep congestion levels the same as the previous year.

**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). The annual change in miles traveled, therefore, includes both new travel due to growth and travel that previously occurred in areas designated as rural.

**Number of Rush Hours** – Time when system might have congestion

### Key Mobility Performance Measure Labels

Note: Designation of an urban area congestion problem as “Much higher”, “Much faster growth”, etc. is determined using a general indicator of the accuracy of the congestion estimates. For regions with the same indicator label, there may be no difference in congestion levels. Different values are used for the indicators in regions over 1 million population and below 1 million population.

Measures	Differences Within These Values May Not Indicate a Difference in Congestion Level	
	Above 1M Population	Below 1M Population
<b>2005 Values</b> Delay per Traveler - Travel Time Index - Total Delay -	5 Hours 5 Index Points 5 Hours x Average Population	3 Hours 3 Index Points 3 Hours x Average Population
<b>1982 to 2005 Trends</b> Delay per Traveler - Total Delay -	5 Hours 5 Hours x Average Population	3 Hours 3 Hours x Average Population

**The Mobility Data for Albany-Schenectady, NY**

<b>Inventory Measures</b>	<b>2005</b>	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>	<b>2000</b>
<b>Urban Area Information</b>						
Population (1000s)	530	530	525	525	520	515
Rank	68	68	68	68	68	68
Urban Area (square miles)	375	375	375	375	375	375
Popn Density (persons/sq mile)	1,413	1,413	1,400	1,400	1,387	1,373
Peak Travelers (1000s)	288	286	282	279	272	266
<b>Freeway</b>						
Daily Vehicle-Miles of Travel (1000s)	6,210	6,210	6,000	5,820	5,730	5,500
Lane Miles	550	550	550	550	550	550
<b>Arterial Streets</b>						
Daily Vehicle-Miles of Travel (1000s)	4,660	4,660	4,475	4,450	4,400	4,375
Lane Miles	1,135	1,135	1,135	1,135	1,135	1,135
<b>Public Transportation</b>						
Annual Psgr-Miles of Travel (millions)	43	53	54	47	43	41
Annual Unlinked Psgr Trips (millions)	12	12	12	12	12	11
<b>Cost Components</b>						
Value of Time (\$/hour)	14.60	14.10	13.75	13.45	13.25	12.85
Commercial Cost (\$/hour)	77.10	74.60	72.65	71.05	69.95	68.00
Fuel Cost (\$/gallon)	2.40	2.14	1.62	1.49	1.72	1.64
<b>System Performance</b>						
<b>Congested Travel</b> (% of peak VMT)	25	25	22	21	19	17
<b>Congested System</b> (% of lane-miles)	33	33	32	32	32	30
<b>Congested Time</b> (number of "Rush Hours")	3.8	3.8	3.6	3.2	3.2	3.0
<b>Annual Increase Needed To Maintain Constant Congestion Level:</b>						
Lane-Miles	33	40	36	42	48	50
Transit Riders or Carpoolers (millions)	7	9	8	9	10	10
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	2,848	2,848	2,420	2,151	1,945	1,772
Rank	68	69	69	71	71	73
Fuel per Peak Traveler (gallons)	10	10	9	8	7	7
Rank	66	68	67	72	74	75
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	4,574	4,575	3,913	3,462	3,204	3,004
Rank	69	69	70	71	72	73
Delay per Peak Traveler (person-hrs)	16	16	14	12	12	11
Rank	67	68	71	72	73	76
Delay due to Incidents (percent)	56	56	56	55	55	54
<b>Travel Time Index</b>						
Rank	73	71	74	77	78	82
<b>Congestion Cost</b>						
Total Cost (\$ millions)	86	83	68	59	54	49
Rank	68	69	69	69	71	72
Cost per Peak Traveler (\$)	300	290	241	210	197	183
Rank	68	68	71	71	73	75

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

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

**The Mobility Data for Albany-Schenectady, NY, Continued**

<b>Inventory Measures</b>	<b>1999</b>	<b>1998</b>	<b>1997</b>	<b>1996</b>	<b>1995</b>	<b>1994</b>
<b>Urban Area Information</b>						
Population (1000s)	510	505	500	495	495	495
Rank	68	68	67	66	66	65
Urban Area (square miles)	370	370	370	370	365	365
Popn Density (persons/sq mile)	1,378	1,365	1,351	1,338	1,356	1,356
Peak Travelers (1000s)	261	255	249	244	241	238
<b>Freeway</b>						
Daily Vehicle-Miles of Travel (1000s)	5,330	5,150	4,975	4,850	4,625	4,605
Lane Miles	545	540	525	525	525	525
<b>Arterial Streets</b>						
Daily Vehicle-Miles of Travel (1000s)	4,350	4,280	4,100	3,950	3,900	3,800
Lane Miles	1,135	1,135	1,135	1,135	1,135	1,135
<b>Public Transportation</b>						
Annual Psgr-Miles of Travel (millions)	47	46	48	47	44	63
Annual Unlinked Psgr Trips (millions)	11	11	11	12	11	12
<b>Cost Components</b>						
Value of Time (\$/hour)	12.40	12.15	12.00	11.70	11.40	11.05
Commercial Cost (\$/hour)	65.80	64.35	63.40	61.95	60.20	58.50
Fuel Cost (\$/gallon)	1.19	1.15	1.31	1.37	1.27	1.15
<b>System Performance</b>						
<b>Congested Travel</b> (% of peak VMT)	16	14	13	12	12	12
<b>Congested System</b> (% of lane-miles)	30	25	26	26	26	22
<b>Congested Time</b> (number of "Rush Hours")	2.9	2.9	2.8	2.8	2.7	2.7
<b>Annual Increase Needed To Maintain Constant Congestion Level:</b>						
Lane-Miles	49	44	38	42	45	57
Transit Riders or Carpoolers (millions)	10	9	7	8	8	10
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	1,611	1,478	1,290	1,220	1,151	1,120
Rank	75	73	74	74	73	72
Fuel per Peak Traveler (gallons)	6	6	5	5	5	5
Rank	77	78	79	77	78	77
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	2,721	2,565	2,243	2,126	1,999	1,964
Rank	74	72	74	73	73	71
Delay per Peak Traveler (person-hrs)	10	10	9	9	8	8
Rank	77	77	77	77	77	77
Delay due to Incidents (percent)	54	54	53	53	53	54
<b>Travel Time Index</b>						
Rank	83	83	83	83	81	79
<b>Congestion Cost</b>						
Total Cost (\$ millions)	42	39	34	31	29	27
Rank	73	72	74	74	73	70
Cost per Peak Traveler (\$)	161	152	136	129	120	115
Rank	77	77	76	77	77	77

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

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

**The Mobility Data for Albany-Schenectady, NY, Continued**

<b>Inventory Measures</b>	<b>1993</b>	<b>1992</b>	<b>1991</b>	<b>1990</b>	<b>1989</b>	<b>1988</b>
<b>Urban Area Information</b>						
Population (1000s)	490	490	490	490	490	485
Rank	65	64	63	62	61	62
Urban Area (square miles)	365	370	370	375	375	375
Popn Density (persons/sq mile)	1,342	1,324	1,324	1,307	1,307	1,293
Peak Travelers (1000s)	232	229	226	223	221	218
<b>Freeway</b>						
Daily Vehicle-Miles of Travel (1000s)	4,520	4,405	4,260	4,160	3,990	3,800
Lane Miles	520	520	535	530	530	530
<b>Arterial Streets</b>						
Daily Vehicle-Miles of Travel (1000s)	3,750	3,700	3,500	3,300	3,105	3,000
Lane Miles	1,130	1,130	1,125	1,120	1,115	1,110
<b>Public Transportation</b>						
Annual Psgr-Miles of Travel (millions)	55	57	64	57	47	48
Annual Unlinked Psgr Trips (millions)	12	12	13	12	13	14
<b>Cost Components</b>						
Value of Time (\$/hour)	10.75	10.50	10.25	10.00	9.25	8.80
Commercial Cost (\$/hour)	57.05	55.40	53.80	51.60	48.95	46.70
Fuel Cost (\$/gallon)	1.21	1.24	1.21	1.07	1.13	1.04
<b>System Performance</b>						
<b>Congested Travel</b> (% of peak VMT)	11	10	11	10	9	9
<b>Congested System</b> (% of lane-miles)	22	22	22	19	19	19
<b>Congested Time</b> (number of "Rush Hours")	2.7	2.6	2.5	2.4	2.4	2.3
<b>Annual Increase Needed To Maintain Constant Congestion Level:</b>						
Lane-Miles	66	67	75	75	77	81
Transit Riders or Carpoolers (millions)	11	12	12	12	12	12
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	994	950	934	878	708	656
Rank	72	71	69	69	71	70
Fuel per Peak Traveler (gallons)	4	4	4	4	3	3
Rank	77	78	76	74	78	77
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	1,746	1,665	1,646	1,546	1,244	1,157
Rank	72	71	68	67	71	67
Delay per Peak Traveler (person-hrs)	8	7	7	7	6	5
Rank	76	76	73	72	76	74
Delay due to Incidents (percent)	53	53	53	53	53	53
<b>Travel Time Index</b>						
Rank	83	81	80	76	79	80
<b>Congestion Cost</b>						
Total Cost (\$ millions)	24	22	21	19	15	13
Rank	70	71	68	67	71	68
Cost per Peak Traveler (\$)	102	97	94	87	66	59
Rank	76	76	73	72	76	73

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

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

**The Mobility Data for Albany-Schenectady, NY, Continued**

<b>Inventory Measures</b>	<b>1987</b>	<b>1986</b>	<b>1985</b>	<b>1984</b>	<b>1983</b>	<b>1982</b>
<b>Urban Area Information</b>						
Population (1000s)	480	480	475	475	495	500
Rank	61	57	57	56	55	53
Urban Area (square miles)	370	370	365	365	365	360
Popn Density (persons/sq mile)	1,297	1,297	1,301	1,301	1,356	1,389
Peak Travelers (1000s)	214	212	209	207	214	214
<b>Freeway</b>						
Daily Vehicle-Miles of Travel (1000s)	3,645	3,270	3,040	2,740	2,495	2,450
Lane Miles	530	525	525	525	480	465
<b>Arterial Streets</b>						
Daily Vehicle-Miles of Travel (1000s)	2,980	2,950	2,920	2,900	2,840	2,750
Lane Miles	1,100	1,090	1,085	1,075	1,070	1,060
<b>Public Transportation</b>						
Annual Psgr-Miles of Travel (millions)	53	54	56	79	79	79
Annual Unlinked Psgr Trips (millions)	14	13	16	17	17	17
<b>Cost Components</b>						
Value of Time (\$/hour)	8.50	8.20	8.00	7.75	7.45	7.20
Commercial Cost (\$/hour)	44.85	43.30	42.50	41.05	39.35	38.10
Fuel Cost (\$/gallon)	1.05	1.02	1.34	1.35	1.38	1.44
<b>System Performance</b>						
<b>Congested Travel</b> (% of peak VMT)	8	7	7	6	7	7
<b>Congested System</b> (% of lane-miles)	18	18	15	15	15	15
<b>Congested Time</b> (number of "Rush Hours")	2.2	2.1	2.0	2.0	2.0	2.0
<b>Annual Increase Needed To Maintain Constant Congestion Level:</b>						
Lane-Miles	81	--	--	--	--	--
Transit Riders or Carpoolers (millions)	11	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	565	511	478	395	373	360
Rank	71	72	71	71	69	69
Fuel per Peak Traveler (gallons)	3	2	2	2	2	2
Rank	74	76	77	77	78	78
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	992	899	842	698	656	630
Rank	71	71	70	70	69	69
Delay per Peak Traveler (person-hrs)	5	4	4	3	3	3
Rank	74	75	75	76	76	76
Delay due to Incidents (percent)	53	53	53	53	53	53
<b>Travel Time Index</b>						
Rank	79	79	79	81	78	78
<b>Congestion Cost</b>						
Total Cost (\$ millions)	11	9	9	7	6	7
Rank	70	70	70	70	68	67
Cost per Peak Traveler (\$)	50	44	42	34	30	31
Rank	73	74	75	75	76	74

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

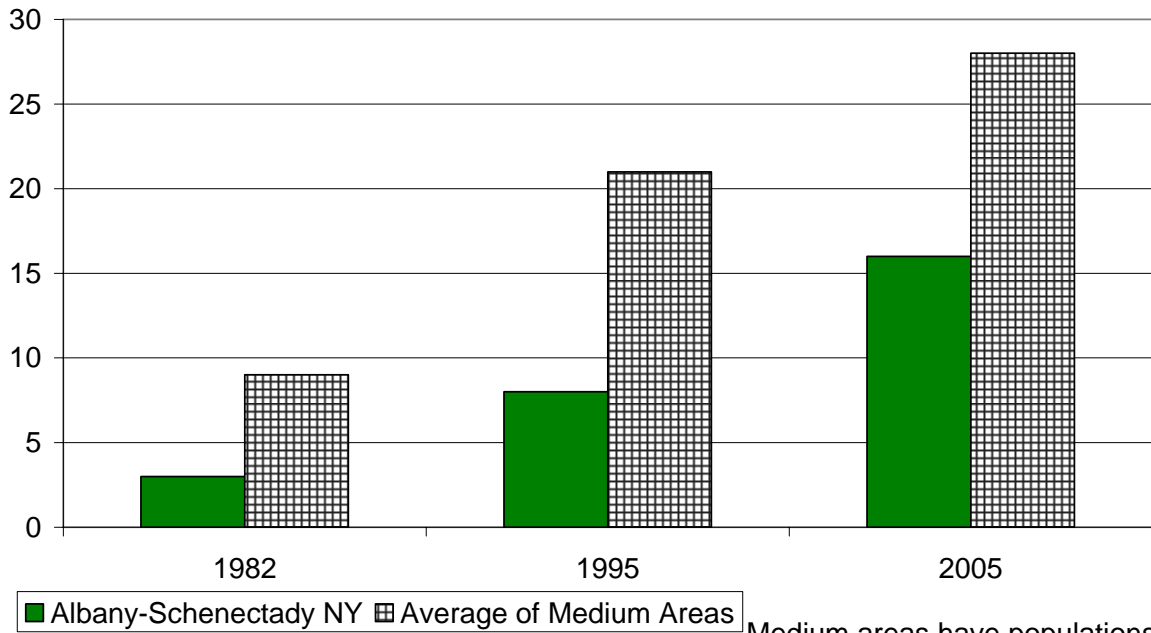
Note: Zeroes in the table reflect values less than 0.5.

## Benefits From Public Transportation Service and Operations Strategies for Albany-Schenectady, NY

<b>Operations Strategies</b>	<b>2005</b>	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>	<b>2000</b>
<b>Freeway Ramp Metering</b>						
Percent of Roadway Miles	--	--	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--	--	--
<b>Freeway Incident Management</b>						
<b>Cameras</b>						
Percent of Roadway Miles	45	45	45	41	35	31
<b>Service Patrols</b>						
Percent of Roadway Miles	45	45	45	42	42	42
Annual Delay Reduction (1000 hours)	62	62	51	27	19	13
<b>Arterial Signal Coordination</b>						
Percent of Roadway Miles	45	45	45	26	23	21
Annual Delay Reduction (1000 hours)	21	21	19	6	6	4
<b>Arterial Access Management</b>						
Percent of Roadway Miles	12	12	12	12	12	12
Annual Delay Reduction (1000 hours)	18	18	16	16	8	6
<b>HOV Lanes</b>						
Daily Passenger-miles of Travel (1000s)	--	--	--	--	--	--
HOV User Delay Savings	--	--	--	--	--	--
<b>Total Effect of Operations Treatments</b>						
Annual Delay Reduction (1000 hours)	101	101	85	48	33	24
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0	0	0
Annual Congestion Cost Savings (\$million)	2.0	1.9	1.5	0.9	0.6	0.4
Travel Time Index with Strategies	1.079	1.079	1.070	1.063	1.058	1.054
Travel Time Index (Base)	1.081	1.081	1.071	1.064	1.058	1.054
<b>Public Transportation Service</b>						
<b>Existing Service</b>						
Annual Passenger-miles of Travel (million)	43	53	54	47	43	41
Unlinked Passenger Trips (million)	12	12	12	12	12	11
Travel Time Index (combined road and transit)	1.078	1.078	1.068	1.062	1.057	1.053
<b>Condition if Public Transportation Service were Discontinued</b>						
Travel Time Index	1.084	1.085	1.074	1.066	1.060	1.056
Annual Delay Increase (1000 hours)	231	260	217	169	157	121
Annual Delay Increase per Peak Traveler (hours)	1	1	1	1	1	0
Annual Congestion Cost Increase (\$million)	4.4	4.7	3.8	2.9	2.6	2.0

### Growth in Delay per Peak Traveler

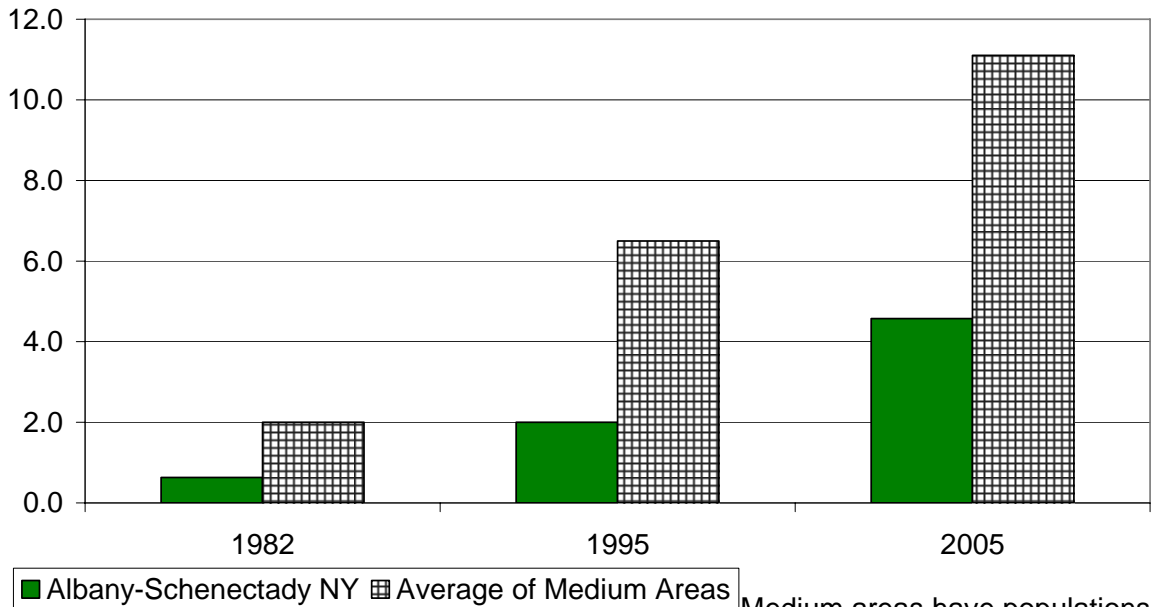
Hours of Delay



Medium areas have populations between 0.5 and 1 million

### Growth in Total Delay

Annual Hours of Delay (million)



Medium areas have populations between 0.5 and 1 million