ENVIRONMENTAL BENEFITS OF A STATEWIDE TRAFFIC VIDEO NETWORK

Final Report

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16. Abstract

The objective of this study is to calculate the reduction in hydrocarbon emissions from the changes in travel behavior of traveler information system users. Research indicates that a certain percentage of motorists who use a traveler information system prior to initiating their travel are willing to change their travel behavior; either by changing their route, time or mode of travel. As a result of these changes in individual travel behavior, positive environmental benefits are created through a decrease in hydrocarbon emissions.

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ABSTRACT

The objective of this study is to calculate the reduction in hydrocarbon emissions from the changes in travel behavior of traveler information system users. Research indicates that a certain percentage of motorists who use a traveler information system prior to initiating their travel are willing to change their travel behavior; either by changing their route, time or mode of travel. As a result of these changes in individual travel behavior, positive environmental benefits are created through a decrease in hydrocarbon emissions.

The author of this study used research conducted by the Washington State Department of Transportation and a major national traveler information service provider to develop the percentage of users willing to make a change in travel behavior (30 percent) and the estimated reduction in VOC, NOx and CO per vehicle-mile-traveled. Using travel statistics from the U.S. Census Bureau and the New York State Department of Transportation, typical commuting trips were developed for each of the six (6) urban areas included in the study. The total number of traveler information system users was developed from actual usage statistics for the 511NY phone service and website and the TrafficLand.com website for a "typical day" in July 2010.

Based on the data used in this study, the author estimates that, for all the regions in this study, the changes in travel behavior from the use of traveler information systems prior to travel can generate a one-day net reduction of 71 kg/day of VOC, 4 kg/day of NOx and 767 kg/day of CO.

ACKNOWLEDGEMENTS

The author wishes to acknowledge the support of Joe Tario at the New York State Energy Research and Development Authority and the staff at the New York State Department of Transportation, System Optimization Bureau; without whom this project would not have been realized. In addition, special thanks go to Mr. Peter Guldberg at Tech Environmental Inc. for providing access to his original research on the environmental benefits of traveler information systems.

TABLE OF CONTENTS

FIGURES AND TABLES

SUMMARY

Research indicates that a certain percentage of motorists who use a traveler information system prior to initiating their travel are willing to change their travel behavior; either by changing their route, time or mode of travel. The author used a conservative figure of 30 percent for the purposes of this study. As a result of these changes in individual travel behavior, positive environmental benefits are created through a decrease in hydrocarbon emissions.

This project integrated more than 300 traffic cameras operated by the New York State Department of Transportation in several urban areas across the state (Buffalo, Rochester, Syracuse, Corning/Elmira, Hudson Valley, and Long Island). The imagery from these traffic cameras was integrated into a single statewide network to support improved traveler information to the public.

Travelers were able to access this information via multiple sources including: TV broadcast, radio traffic reports and the Internet, including the 511NY and Trafficland.com websites. Based on usage of the 511NY website and phone service and the TrafficLand.com website on a "typical day" in July 2010, an estimate of the number of users likely to change their travel behavior can be calculated. Using region-specific data on typical commute times and distances, vehicle-miles-traveled (VMT) can be developed for each region. The VMT data then allows for the calculation of the reduction in VOC, NOx and CO emissions for each mile traveled.

Based on the data used in this study, the author estimates that, for all the regions in this study, the changes in travel behavior from the use of traveler information systems prior to travel can generate a one-day net reduction of 71 kg/day of VOC, 4 kg/day of NOx and 767 kg/day of CO. These changes in travel behavior also would have a positive impact on energy consumption through reduced idling in congestion and increased transit ridership. In addition, this project produced a host of other benefits, including: improved quality of traffic information; improved quantity of traffic information; improved accessibility to traffic information; improved highway safety benefits through reduction in congestion; and improved traffic operations through better access to information by NYSDOT operational units.

Section 1

INTRODUCTION

Research indicates that a certain percentage of motorists who use a traveler information system prior to initiating their travel are willing to change their travel behavior; either by changing their route, time or mode of travel. As a result of their changes in travel behavior, positive environmental benefits are created through a decrease in hydrocarbon emissions. This study seeks to estimate the hydrocarbon emission reductions from altered travel behavior by traveler information system users in several urban areas in the State of New York.

PROJECT BACKGROUND

In August, 2007, the New York State Energy Research and Development Authority (NYSERDA) and the New York State Department of Transportation (NYSDOT) issued a joint research solicitation seeking proposals with the goal of improving the energy and environmental performance of the existing transportation systems in New York State. [1]

This solicitation sought proposals in two areas:

Category A – Procedures and Practices: Proposals to develop or support innovative, energy efficient strategies in each of five core areas: planning and design, construction, project implementation policy, maintenance and operations, and landscaping and lighting

Category B – Underutilized Technology Demonstrations: Proposals to demonstrate existing commercial transportation technologies that have the potential to improve the energy and environmental performance of the existing transportation systems in New York State and that have not already been previously deployed in New York State to any significant extent

TrafficLand submitted a proposal to integrate all NYSDOT traffic cameras statewide into a single, robust network and deliver that video content to motorists via multiple media outlets including the Internet, broadcast television and radio. [2] This proposal was accepted by NYSERDA and NYSDOT under the jointly-funded research program.

[1] New York State Energy Research and Development Authority and New York State Department of Transportation, "Sustainable Transportation Systems," Program Opportunity Notice 1173, Albany, New York, 2007

[2] TrafficLand , Inc., "Statewide Video Network", Fairfax, Virginia, 2007

PROJECT OVERVEW

NYSDOT maintains traffic management centers (TMC) in several major urban areas statewide, including:

- Region 1 – Albany
- Region 3 – Syracuse
- Region 4 – Rochester
- Region 5 – Buffalo
- Region 6 – Corning/Elmira
- Region 8 – Hudson Valley
- Region 10 – Long Island
- Region 11 – New York City

These operations centers utilize multiple technologies to monitor traffic conditions on roadways in their respective areas including closed circuit television (CCTV) cameras, dynamic message signs, highway advisory radio among others. TrafficLand proposed to access the CCTV systems at each TMC and integrate those video assets into a single, robust network for redistribution to the public, media and first responders. By improving the quantity and quality of video imagery to travelers, they would be able to make more informed decisions on where, when and how to travel, thus producing positive air quality benefits through more efficient travel decisions. TrafficLand would operate the statewide video network for a period of 12-months to demonstrate the benefits of such a system to the environment, traffic management and public safety.

Figure 1-1: Buffalo TMC Photo

Figure 1-2: Rochester TMC Photo

A total of 568 traffic cameras were available for integration and redistribution:

- Region 1 – Albany (29 cams)
- Region 3 – Syracuse (19 cams)
- Region 4 – Rochester (27 cams)
- Region 5 – Buffalo (54 cams)
- Region 6 – Corning/Elmira (27 cams)
- Region 8 – Hudson Valley (12 cams)
- Region 10 – Long Island (200 cams)
- Region 11 – New York City (200 cams)

TrafficLand submitted a System Design document on August 12, 2008 and was given approval to begin its video integration efforts. Video upload systems were deployed at the following TMCs:

- Region 4 TMC in Rochester on August 26-28, 2008
- Region 3 TMC in Syracuse on October 22-24, 2008
- Region 10 TMC in Long Island on October 27-31, 2008
- Region 6 TMC in Painted Post on November 14, 2008
- Region 5 TMC in Buffalo on March 3-7, 2009
- Region 8 TMC in Hudson Valley on April 15-17, 2009

TrafficLand was unable to deploy video upload systems at the Region 1 TMC in Albany due to lack of physical space and the Region 11 TMC in New York City due to on-going CCTV system upgrade project. Traffic video from these facilities will be integrated into the TrafficLand network as soon as they are made available by NYSDOT.

On May 1, 2010, NYSDOT approved the start of the 12-month pilot project period.

VIDEO DISTRIBUTION ACTIVITIES

In order to affect traveler behavior, the video imagery must be made readily available to the public. Toward that end, TrafficLand proposed to disseminate the video imagery via multiple media to provide the widest possible access by travelers. These media include:

- TrafficLand website (www.trafficland.com)
- New York State DOT 511 website (www.511ny.org)
- WROC-TV, Rochester
- WHAM-TV, Rochester
- WSYR-TV, Syracuse
- WGRZ-TV, Buffalo
- Wxxx-TV, New York City
- 1010 WINS Radio website, New York City (www.1010WINS.com)

511NY website users are able to access all NYSDOT traffic cameras via standard web browser. The video imagery updates at a maximum refresh rate of one (1) frame every thirty (30) seconds.

In the New York City metro area, all websites receiving video imagery from TrafficLand are able to provide users with not only the NYSDOT traffic video imagery, but also imagery from the Connecticut Department of Transportation, the City of New York, the New Jersey Department of Transportation and New Jersey Turnpike Authority; providing travelers with a comprehensive view of regional traffic conditions.

Imagery provided to local broadcast television stations is provided to the public as live streaming video at a rate of 18-20 frames per second. Each TV outlet provides daily traffic reports during typical morning and evening rush hour periods.

Section 2

RESEARCH METHODOLOGY

Research conducted by the Washington State Department of Transportation (WSDOT) indicates that a significant percentage of motorists accessing a telephone-based traveler information system prior to initiation of their trip are likely to alter their travel behavior based on the information they receive. [3]

The WSDOT survey data indicated that 45% of commuters would change their route of travel, 45% would change their time of travel and 10% would change their mode of travel. [4]

Similar research conducted by SmartRoute Systems (SRS) on their *SmarTraveler* telephone-based traveler information system in the Boston, Massachusetts area indicated that 96% of users would change the time, route or mode of travel at occasionally based on the information they received from the system while 30% would change their time, route or mode of travel frequently. [5]

In 1993, SRS retained the services of Tech Environmental, Inc. to determine how traveler information systems, as part of the Massachusetts State Implementation Plan (SIP) to attain ozone air quality standards, could reduce volatile organic compound (VOC), carbon monoxide (CO) and nitrogen oxide (NOx) emissions in the metropolitan Boston region.

In this study, TrafficLand proposed to use the Tech Environmental research as a basis for estimating the potential emission reductions of delivering improved traffic video information to motorists via the Internet, TrafficLand collected current information on commuting patterns in major urban areas in New York State served by NYSDOT traffic camera networks and used the Tech Environmental data to develop estimated emissions reductions in VOC, NOx and CO based on the number of motorists using the TrafficLand website (www.trafficland.com), the NYSDOT 511 phone system, and the NYSDOT 511 website (www.511ny.org).

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[3] Washington State Department of Transportation, Real-Time Motorist Information for Reducing Urban Freeway Congestion: Commuter Behavior, Data Conversion and Display, and Transportation Policy, Reports WA-RD240.1 and 240.2, Seattle, Washington, 1992.

[4] Ibid

[5] Tech Environmental, Inc., Air Quality Benefits Study of the *SmarTraveler* Advanced Traveler Information Service, Waltham, Massachusetts, 1993

Figure 2-1: Screenshot of 511NY Website

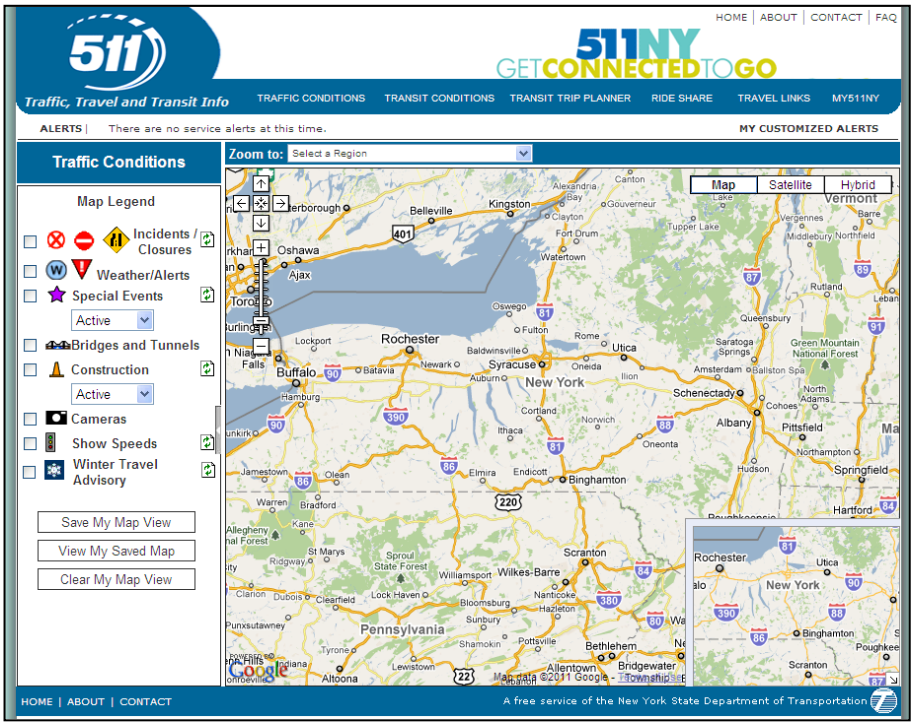
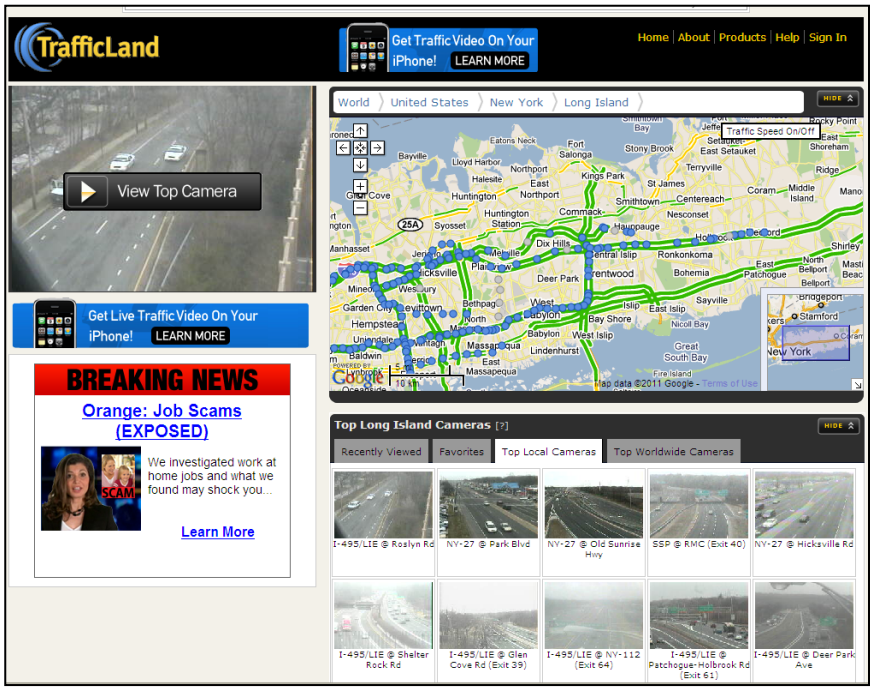


Figure 2-2: Screenshot of TrafficLand Website



BASELINE RESEARCH

Tech Environmental was tasked with drawing "some simple conclusions" from the operational experience of the *SmarTraveler* system and calculate the air quality benefits. Their approach focused on the following objectives: [6]

- Project the usage of the *SmarTraveler* system in 1999 (six years into the future)
- Determine the percentage of users that will make changes to their trip as a result of using SmarTraveler
- Determine how those trips will be changed
- Determine the frequency of delay-causing incidents
- Calculate the effects of trip change on trip mileage and speed
- Calculate the reductions in VOC, NOx and CO emissions

Tech Environmental estimated the future usage of SmarTraveler using trend analysis from actual 1993 call volumes. The WSDOT and internal SRS research provided the percentage of users willing to make a change in travel behavior and the type of travel behavior (route, mode, time) that they would change. Incident frequency was developed from internal SRS data. Typical commuting trip patterns developed from 1990 statewide census transportation planning data were used to estimate the impact of trip change on mileage and speed. And finally, the U.S. Environmental Protection Agency (EPA) Mobile Emissions 5A model was used to calculate the reductions in VOC, CO and NOx emissions. [7]

BASELINE RESEARCH ASSUMPTIONS

The evaluation assumptions used in the Tech Environmental study for SmartRoute Systems were:

- ATIS system call volume: 96,000 calls per day
- ATIS users will change travel behavior: 30%
- Typical commute distance/time/speed: 23.5 miles/45.6 minutes/30 mph
- Additional time added to trip due to incidents: 22 additional minutes, speed reduced to 20 mph

[6] Tech Environmental, page 3
[7] Ibid, pp. 5-8

ENVIRONMENTAL BENEFITS OF ATIS SYSTEMS

Based on the methodology and assumptions noted above, Tech Environmental estimated the effects of the SmarTraveler system to be as follows:

Figure 2-1

Best Estimate of Emissions Reductions
Produced by SmarTraveler ATIS in 1999 [8]

Type of Trip/Trip Change	VOC (kg/day)	NO_x (kg/day)	CO (kg/day)
Total Without ATIS 676,800 VMT @ 20 mph	1,963	1,570	15,242
Change Trip Route 367,200 VMT @ 30 mph	801	845	5,581
Change Trip Time 304,560 VMT @ 30 mph	664	700	4,629
Change Trip Mode 0 VMT	0	0	0
Total With ATIS	1,465	1,545	10,210
Net Reduction	498	25	5,032

[8] Ibid, p. 10

The net reduction in VOC was estimated to be 498 kg/day; NOx was 25 kg/day; and CO was 5,032 kg/day. These figures represented the daily reduction in harmful vehicle emissions for a typical summer day in July 2010.

Calculating the kg/day reductions per vehicle mile traveled (VMT), the data is as follows:

Figure 2-2

Estimated Emission Reduction
Per Vehicle Mile Traveled

Type of Trip/Trip Change	VOC (kg/day/vmt)	NO_x (kg/day/vmt)	CO (kg/day/vmt)
Total Without ATIS 676,800 VMT @ 20 mph	0.0029004137	0.0023197400	0.0225206856
Change Trip Route 367,200 VMT @ 30 mph	0.0021813725	0.0023011983	0.0151988017
Change Trip Time 304,560 VMT @ 30 mph	0.0021801944	0.0022983977	0.0151989756
Change Trip Mode 0 VMT	0.0000000000	0.0000000000	0.0000000000
Total With ATIS	0.0021807835	0.0022997980	0.0151988887
Net Reduction	0.0014826724	0.0000744313	0.0149815410

The rate of emission reduction per vehicle mile traveled for VOC, NOx and CO becomes the key input into the analysis of the environmental benefits of this research project. These figures will be used to estimate the emission reductions for typical commuting trips in four (4) major urban areas in New York State where improved traffic video content is provided by TrafficLand and NYSDOT.

Section 3

RESEARCH CONCLUSIONS

TrafficLand used the framework of the Tech Environmental research to develop estimates of emission reductions for altered travel behavior from users of ATIS systems in the following Metropolitan Statistical Areas (MSA):

- Buffalo (NYSDOT Region 5 – Counties of Erie, Niagara)
- Rochester (NYSDOT Region 4 –Counties of Livingston, Monroe, Ontario, Orleans, Wayne)
- Syracuse (NYSDOT Region 3 – Counties of Madison, Onondaga, Oswego)
- New York City metro area (NYSDOT Regions 8, 10, 11 –Counties of Dutchess, Orange, Putnam, Rockland, Ulster, Westchester, Nassau, Suffolk, Kings, Queens, New York, Richmond)

The Corning/Elmira area (NYSDOT Region 6) was not included in the analysis due to lack of sufficient ATIS system usage data.

PROJECT RESEARCH ASSUMPTIONS

The research assumptions for this project are developed from actual usage data from the TrafficLand and 511NY websites as well as United States Census Bureau data from the 2000 decennial census. Average travel time figures for each MSA were developed using journey to work data from the United States Census Bureau 2000 decennial census for each county in the MSA Average distance to work was calculated using the average travel time at an average speed of 30 mph as in the Tech Environmental study. The percentage of ATIS users altering their travel plans was set at 30% based on the baseline research by WSDOT and SRS.

UTILIZATON OF ATIS SYSTEMS

TrafficLand calculated ATIS usage by combining average daily usage for the 511NY phone system, 511NY website and the TrafficLand.com website. Figure 3-2 identifies the average daily usage by system and region. For this analysis, the total number of ATIS users for July 12, 2010 is 5,730.

Figure 3-1

Average Daily Usage of ATIS Systems

Region	511NY Phone	511NY Web	Traffic land.com Web	Total Usage
Syracuse	114	133	79	326
Rochester	106	124	92	322
Buffalo	110	130	127	367
Hudson Valley	576	677	209	1,462
Long Island	447	524	162	1,133
NYC	835	981	304	2,120
Total NYC Metro Area	1,858	2,182	675	4,715
Total All Metro Areas	2,188	2,569	973	5,730

Syracuse: Syracuse 511NY phone usage equals 4.5% of average daily phone system usage in July 2010 of 2,507 calls per day; 511NY web usage estimated at 4.5% of average daily web usage in July 2010 of 2,945 visits per day; TrafficLand.com web usage equals actual number of visits on July 12, 2010.

Rochester: Rochester 511NY phone usage equals 4.2% of average daily phone system usage in July 2010 of 2,507 calls per day; 511NY web usage estimated at 4.2% of average daily web usage in July 2010 of 2,945 visits per day; TrafficLand.com web usage equals actual number of visits on July 12, 2010.

Buffalo: Buffalo 511NY phone usage equals 4.4% of average daily phone system usage in July 2010 of 2,507 calls per day; 511NY web usage estimated at 4.4% of average daily web usage in July 2010 of 2,945 visits per day; TrafficLand.com web usage equals actual number of visits on July 12, 2010.

Hudson Valley: Hudson Valley 511NY phone usage equals 23% of average daily phone system usage in July 2010 of 2,507 calls per day; 511NY web usage estimated at 23% of average daily web usage in July 2010 of 2,945 visits per day; TrafficLand.com web usage equals actual number of visits on July 12, 2010.

Long Island: Long Island 511NY phone usage equals 17.8% of average daily phone system usage in July 2010 of 2,507 calls per day; 511NY web usage estimated at 17.8% of average daily web usage in July 2010 of 2,945 visits per day; TrafficLand.com web usage equals actual number of visits on July 12, 2010.

New York City: New York City 511NY phone usage equals 33.3% of average daily phone system usage in July 2010 of 2,507 calls per day; 511NY web usage estimated at 33.3% of average daily web usage in July 2010 of 2,945 visits per day; TrafficLand.com web usage equals actual number of visits on July 12, 2010.

Based on the 1993 research, Tech Environmental estimates that 30 percent of ATIS users will change their travel behavior based on the information they receive. In this analysis, the total number estimated to make changes in their travel behavior is 1,719 travelers.

Figure 3-2

Number Changing Travel Behavior

Region	511NY Phone	511NY Web	Trafficland.com Web	Total Usage
Syracuse	34	40	24	98
Rochester	32	37	28	97
Buffalo	33	39	38	110
Hudson Valley	173	203	63	439
Long Island	134	157	49	340
NYC	251	294	91	636
Total NYC Metro Area	557	655	203	1,415
Total All Metro Areas	656	771	292	1,719

VMT CALCULATION

In order to determine the environmental benefits of ATIS system usage, total vehicle miles traveled (VMT) must be calculated for users in each region based on their average travel distance to work.

$$\text{VMT} = \frac{\text{Average Travel Distance} \times \text{Number Using ATIS}}{100}$$

Figure 3-3 identifies the values for the key variables used in this research project. Based on these figures, the total daily VMT for ATIS users on Monday, July 12, 2010 is 96,214 miles.

Based on the VMT figures for each region, emissions reduction estimates can be calculated based on the per VMT reduction for each category from the 1993 study (see Figure 2-2 above).

Figure 3-3

Total Vehicle Miles Traveled by Region [9]

NYSDOT Region	NYSDOT Region #	MSA	Avg. Travel Time (minutes)	Avg. Travel Distance (miles)	Number Using ATIS (number of visitors)	Total Daily VMT
Syracuse	3	Syracuse	22.00	11.00	326	3,586
Rochester	4	Rochester	23.80	11.90	322	3,832
Buffalo	5	Buffalo	20.50	10.25	367	3,762
Hudson Valley	8	New York City	32.17	16.09	1,462	23,516
Long Island	10	New York City	33.00	16.50	1,133	18,695
New York City	11	New York City	40.40	20.20	2,120	42,824
Total: All Regions					**5,730**	**96,214**

[9] Average Travel Time from "1990-2000 Mode and Travel Time to Work," U.S. Census Data (2000); Average Travel Distance = Average Travel Time times 30 mph average speed; Number Using ATIS from 511 Consolidated Monthly Report: July 2010 and TrafficLand.com.

REGIONAL ANALYSIS OF DATA

Based on the per VMT reductions in VOC, NOx and CO developed by Tech Environmental, TrafficLand estimated the amount of emission reductions in each MSA based on the VMT data developed from the 2000 U.S. Census. The data for each region is presented below.

Buffalo, New York. The estimated amount of emissions reductions in Buffalo, New York on Monday, July 12th is 3 kg/day of VOC, 0 kg/day of NOx and 54 kg/day of CO.

Figure 3-4

Best Estimate of Emissions Reductions Produced by TrafficLand.com and 511NY Phone & Web (Buffalo, New York)

Type of Trip/Trip Change	VOC (kg/day)	NO_x (kg/day)	CO (kg/day)
Total Without ATIS 3,762 VMT @ 20 mph	11	9	85
Change Trip Route 2,041 VMT @ 30 mph	4	5	5
Change Trip Time 1,693 VMT @ 30 mph	4	4	26
Change Trip Mode 0 VMT	0	0	0
Total With ATIS	8	9	30
Net Reduction	3	0	54

Rochester, New York. The estimated amount of emissions reductions in Rochester, New York on Monday, July 12th is 3 kg/day of VOC, 0 kg/day of NOx and 28 kg/day of CO.

Figure 3-5

Best Estimate of Emissions Reductions Produced by TrafficLand.com and 511NY Phone & Web (Rochester, New York)

Type of Trip/Trip Change	VOC (kg/day)	NO_x (kg/day)	CO (kg/day)
Total Without ATIS 3,832 VMT @ 20 mph	11	9	86
Change Trip Route 2,079 VMT @ 30 mph	5	5	32
Change Trip Time 1,724 VMT @ 30 mph	4	4	26
Change Trip Mode 0 VMT	0	0	0
Total With ATIS	8	9	58
Net Reduction	3	0	28

Syracuse, New York. The estimated amount of emissions reductions in Syracuse, New York on Monday, July 12th is 3 kg/day of VOC, 0 kg/day of NOx and 28 kg/day of CO.

Figure 3-6

Best Estimate of Emissions Reductions Produced by TrafficLand.com and 511NY Phone & Web (Syracuse, New York)

Type of Trip/Trip Change	VOC (kg/day)	NO_x (kg/day)	CO (kg/day)
Total Without ATIS 3,586 VMT @ 20 mph	10	8	81
Change Trip Route 1,945 VMT @ 30 mph	4	4	4
Change Trip Time 1,614 VMT @ 30 mph	4	4	25
Change Trip Mode 0 VMT	0	0	0
Total With ATIS	8	8	29
Net Reduction	3	0	52

New York City, New York. The estimated amount of emissions reductions in New York City, New York on Monday, July 12th is 63 kg/day of VOC, 3 kg/day of NOx and 632 kg/day of CO.

Figure 3-7

Best Estimate of Emissions Reductions Produced by TrafficLand.com and 511NY Phone & Web (New York City, New York)

Type of Trip/Trip Change	VOC (kg/day)	NO_x (kg/day)	CO (kg/day)
Total Without ATIS 85,035 VMT @ 20 mph	247	197	1,915
Change Trip Route 46,131 VMT @ 30 mph	101	106	701
Change Trip Time 38,266 VMT @ 30 mph	83	88	582
Change Trip Mode 0 VMT	0	0	0
Total With ATIS	184	194	1,283
Net Reduction	63	3	632

All Metro Areas. The estimated amount of emissions reductions in All Regions on Monday, July 12th is 71 kg/day of VOC, 4 kg/day of NOx and 767 kg/day of CO.

Figure 3-8

Best Estimate of Emissions Reductions Produced by TrafficLand.com and 511NY Phone & Web (All Regions)

Type of Trip/Trip Change	VOC (kg/day)	NO_x (kg/day)	CO (kg/day)
Total Without ATIS	279	223	2,167
Change Trip Route	114	120	742
Change Trip Time	94	100	658
Change Trip Mode	0	0	0
Total With ATIS	208	220	1,400
Net Reduction NYSERDA Study	71	4	767
Net Reduction 1993 Study	498	25	5,032

As Figure 3-8 illustrates, the amount of emissions reductions estimated by this study are significantly less than those estimated in the 1993 study by Tech Environmental. The critical difference between the two results is the number of ATIS users. In 1993, Tech Environmental estimated that 96,000 users would access an ATIS system for traffic information on a given day in July 1993. In this study, the estimate is 5,730 users; a significant difference. As a result, the emissions reductions estimated by this research are a fraction of those estimated in 1993.

ENERGY CONSUMPTION ANALYSIS

While the issue of energy consumption was not the primary focus of this research, certain impacts can be developed from the data. [10]

This study assumed that 30 percent of ATIS users would make a switch in their travel behavior based on information received from the system. The change in travel behavior would involve either a change in:

- trip route;
- trip time; or
- mode of travel

Those changing trip route typically will drive further on that trip segment as they seek to avoid congestion or an incident on their primary route choice. As a result, trip length will increase yet so will average speed as the alternate route is likely to be less congested. The result of such travel decisions leads to less time stuck in congestion and therefore less time with the vehicle idling. These changes in trip behavior would have a positive impact on energy consumption (i.e. reducing overall energy consumption for that trip segment).

Those changing trip time typically will travel on their primary route choice but either earlier or later to avoid know congestion or incidents. As a result, these trips will be direct to the destination along the primary route choice and at a higher speed. The result of such travel decisions leads to less time stuck in congestion and therefore less time with the vehicle idling. In addition, these travel decisions are likely to be along the most direct route possible. These changes in trip behavior would have a positive impact on energy consumption.

Those changing their travel mode (from car to transit) would have the greatest impact on energy consumption as their entire vehicle-based trip is avoided; reducing their own energy consumption and reducing energy consumption for other motorists by reducing congestion due to the removal of those vehicles from the roadway.

OTHER BENEFITS

The development of a statewide video network and improved access to that information via multiple media outlets provides other intangible benefits to motorists in the State of New York. These benefits include:

- Improved quality of traffic information
- Improved quantity of traffic information
- Improved accessibility to traffic information
- Improved highway safety benefits through reduction in congestion
- Improved traffic operations through better access to information by NYSDOT operational units

While not quantifiable, per se, these benefits contribute to an overall improvement quality of life for motorists by providing them better information, where and when they need it, to make more informed travel decisions about where, when and how to travel.

[10] Tech Environmental, page 6

BIBLIOGRAPHY

New York State Department of Transportation, Office of Traffic Safety and Mobility, 511 Consolidated Monthly Report: July 2010, Albany, New York, 2010

New York State Energy Research and Development Authority and New York State Department of Transportation, Sustainable Transportation Systems, Program Opportunity Notice 1173, , Albany, New York, 2007

Tech Environmental, Inc., Air Quality Benefits Study of the *SmarTraveler* Advanced Traveler Information Service, Waltham, Massachusetts, 1993

TrafficLand, Inc., Statewide Video Network, proposal submitted to New York State Research and Development Authority and New York State Department of Transportation, Program Opportunity Notice 1173, Fairfax, Virginia, 2007

U.S. Census Bureau, 1990-2000 Comparison of Residence-based Mode to Work and Average Travel Time to Work, Demographic Profiles from the 2000 U.S. Census, Washington, D.C., 2002

Washington State Department of Transportation, Real-Time Motorist Information for Reducing Urban Freeway Congestion: Commuter Behavior, Data Conversion and Display, and Transportation Policy, Reports WA-RD240.1 and 240.2, Seattle, Washington, 1992.