Transportation Issue Brief

New York State Energy Plan 2009

December 2009

1 Overview

Transportation is vital to the economic well-being of New York. It provides for the movement of people and goods and is critical to the quality of life for New Yorkers. The State's transportation system is extensive and diverse, and accommodates many modes of travel: from roads to rail, from bus to ferry, from bicycle to airplane, from barges and freighters to walking. All these modes are used extensively and their use is expected to increase with time. It is imperative, therefore, to keep New York's transportation system operational and in good working order.

The transportation sector in New York is heavily dependent on petroleum as a source of energy. Many current national and State transportation funding programs rely, either directly or indirectly, on petroleum use to allocate government funds to support the State's transportation network. From the perspective of the State Energy Plan's stated objectives of increasing New York's energy independence over the planning horizon and putting New York on a trajectory to significantly reduce greenhouse gas emissions by the year 2050, this reliance on petroleum is not sustainable. To be consistent with the State's multiple objectives, the transportation sector will have to shift its focus. It will have to diversify its fuel sources and rapidly expand its use of energy efficient technologies, not only in vehicles that operate on the system but also technologies that make the transportation network more efficient as a whole.

Usage patterns will also need to change to increase the energy efficiency of the transportation system. There are several ways this can be accomplished. Reducing travel, particularly by single-occupant vehicles, is one way. Increasing the use of public transportation, carpooling, and diverting travelers and the movement of freight to more efficient transportation modes, such as rail for long haul delivery of freight, are other ways.

Current transportation funding levels are not adequate to address the required maintenance of the existing transportation system.[1,2] These funding limitations will be exacerbated in the future, as New York must simultaneously transform the system to reduce petroleum dependency, operate more efficiently and meet climate change goals. Federal and State transportation funding mechanisms need to recognize these priorities.

[1] DOT. *Multimodal Transportation Program Submission: 2009-2014 (the Five Year Capital Program)*. 2008. https://www.nysdot.gov/portal/page/portal/programs/repository/NYSDOT-Capital-Plan-March2008.pdf

[2] DOT. *Multimodal Investment Needs and Goals For the Future (20 Year Needs Assessment)*. 2008. https://www.nysdot.gov/portal/page/portal/programs/repository/multimodal%20investment%20needs.pdf

2 Recent Events Affecting the Transportation System

Two major developments, which are still unfolding on the national and international levels, have and will continue to affect the State's transportation sector. The first is the extreme volatility in the petroleum products market and the second is the availability of federal stimulus funding for transportation projects.

2.1 The Recent Price Volatility in Markets for Petroleum Products

Nationally, gas prices have risen dramatically in the last two years. In January 2007, the average national gasoline price was $2.29 per gallon. During July 2008 it hit $4.11 per gallon.[3] Although prices have dropped since July's peak, it is too soon to tell if this is a temporary reprieve. In any event, this spike has sensitized the public to the possibility of long-term high fuel prices and has had several potential and noticeable effects, related to highway travel, use of public transportation and purchase of new vehicles.

The American Public Transportation Association (APTA) reports that public transportation ridership in the second quarter of 2008 increased by more than 5 percent compared with the same quarter of the previous year.[4] According to APTA, 86 percent of public transportation operators nationwide have experienced increases in ridership. In New York, the average increase in ridership for the last quarter of 2007 was 7 percent compared to the same period one year earlier. This represents a significant increase on top of an already significant public transportation use.

The largest increases in ridership on a national level are for light rail systems (11.2 percent), followed by trolley (6.7 percent), commuter rail (5.4 percent), heavy rail (4.4 percent) and bus (3.7 percent).[5] These are national averages and individual operators have experienced a wide range of ridership increases. For example, in Buffalo, light rail ridership jumped 49.5 percent, the largest percent rise of any municipality in the United States. These unprecedented ridership increases have also presented significant operational issues for public transportation systems, as many systems nationwide are struggling to provide sufficient system capacity to address increased demands. A significant percentage of public transportation providers have insufficient funding to address additional service requirements and as a result, approximately 40 percent of the agencies around the country have reported "pass-ups" (turning down waiting passengers at bus stops) on at least one portion of their core routes. In addition, the cost of increased service demands coupled with high diesel fuel prices and declining federal, State and local aid,

[3] U.S. Energy Information Administration (EIA). *Weekly U.S. Regular All Formulations Retail Gasoline Prices (cents per gallon).* 2008. http://tonto.eia.doe.gov/dnav/pet/hist/mg_rt_usw.htm

[4] APTA. *Transit Ridership Report: Second Quarter 2008.* 2008. Page 1. http://www.apta.com/resources/statistics/Documents/Ridership/2008_q2_ridership_APTA.pdf

[5] APTA. *Transit Ridership Report: Second Quarter 2008.* 2008. Page 1. http://www.apta.com/resources/statistics/Documents/Ridership/2008_q2_ridership_APTA.pdf

has resulted in more than one-third of the nation's public transportation operators reducing revenue service and more than 60 percent increasing fares and/or adding fuel surcharges.

New York has seen similar trends in public transportation ridership. Table 1 lists percentage increases in ridership for different types of public transportation for five metropolitan areas in New York. The most obvious trend is that increasing gasoline prices pushed drivers to ride public transportation and the most significant increases in ridership were in the less dense, less urban communities. The New York City metropolitan area showed the smallest percentage increases in the most heavily used types (bus and rail) for the first half of 2008. Similarly, public transportation agencies which serve areas that are less urban, or more sprawled (Syracuse, Buffalo, and the Capital District), saw some of the greatest percentage increases. This trend can be attributed to many factors. One factor is that the New York City transit system is well-established and has been serving its residents and tourists for decades. Another factor which plays a greater role in smaller, less urban municipalities is sprawl, which is characteristic of these communities. Residents of these areas are much more likely to travel by personal automobile as their daily trips will be longer and their destinations may not be included on a public transit route. This increase in transit ridership across the State supports the conclusion that drivers made the decision to use public transportation rather than pay increasing gasoline prices.

Table 1. Percent Increase in Unlinked Passenger Trips for Selected Transit Systems and Cities (first half of 2007 compared to first half of 2008).

	Bus	Paratransit	Commuter Rail	Ferry
Albany	14.0	13.2	NA	NA
Buffalo	6.3	15.7	25.5	NA
Long Island	2.8	4.6	4.7	NA
New York City	1.3	20.7	4.2	32.8
Syracuse	16.4	13.6	NA	NA

Source: APTA. *Transit Ridership Report: Second Quarter 2008*. 2008. Page a 25-26.
http://www.apta.com/resources/statistics/Documents/Ridership/2008_q2_ridership_APTA.pdf

With respect to highway travel, in August 2008, Americans drove 15 billion fewer miles (5.6 percent less) than they did in August 2007 – the largest ever year-to-year decline recorded. The effect of higher gasoline prices on vehicle miles traveled (VMT) in New York has been observed, though it may be too early to detect a significant trend. The Federal Highway Administration (FHWA) reported that between March 2007 and March 2008 VMT declined 2.4 percent, yet for the period between February 2007 and February 2008 there was no change. Using all the continuous traffic counters operated by the New York State Department of Transportation (DOT) and comparing the first six months of 2007 to the first six months of 2008, the daily VMT declined by 1.53 percent. However, 59 percent of these traffic counters have shown a decline in VMT, 26 percent have shown an increase and 15 percent have shown no change.[6]

[6] DOT. *Traffic Data Report for New York State.* 2008.
https://www.nysdot.gov/divisions/engineering/technical-services/highway-data-services/traffic-data

Although it is too early to detect any long term changes from the recent price spike, clearly, the effects are magnified by the transportation sector's lack of alternatives to petroleum. As described above, this affects the public (whether drivers or users of public transportation), transportation providers and various sectors of the economy (gas station retailers, automobile dealers, automobile manufacturers, etc.). A more diverse supply of fuels in the transportation sector would likely reduce the impact of future price spikes.

2.2 Federal Stimulus Funding for Transportation Infrastructure

The American Recovery and Reinvestment Act (ARRA) was signed by President Barack Obama in February, 2009. This stimulus legislation provides funding for, among other things, transportation infrastructure projects. At the national level, this includes $48 billion in funding for transportation capital projects; of this total, New York is expected to receive at least $1.25 billion for mass transit and $1.1 billion for highways and bridges. The pool of mass transit dollars can be used for capital investments in bus and rail related activities such as replacement of buses and rail cars, preventative maintenance, overhaul of buses, rebuilding of buses, crime prevention and security equipment, and construction of maintenance and passenger facilities and stations in large urban areas and rural areas. The $1.1 billion dedicated for highway and bridges will go to support immediate projects designed to maintain the system "in a state of good repair," to reconstruct and repair highways, roads and bridges as well as maintain or build culverts, sidewalks, pedestrian/bike routes and other transportation facilities.

Since New York's transportation system's maintenance needs are great, the State and local governments are aggressively seeking funding from ARRA and other sources to achieve a state of good repair of the existing system. Other sections of this Issue Brief (Section 4.4) explain the structure of current transportation funding in more detail and describe the additional needs of the system.

3 The Transportation System in New York

New York's transportation system is a well-established, diverse system that covers all transportation modes. It is a reliable and extensive network, but an aging one, presenting challenges to its maintenance and improvement. Different components of New York's transportation system fall under the jurisdiction of various governmental agencies at the federal, State and local levels.

3.1 Transportation Planning

Transportation planning and decision making in New York is driven by the federal planning process, the framework mandated for the State's receipt of federal transportation funds. In New York, DOT has umbrella responsibility for coordinated, balanced statewide transportation planning which is carried out in collaboration with the State's 13 Metropolitan Planning Organizations (MPOs) in urban areas and the many various local officials in non-metropolitan areas. MPOs are federally required planning entities, designated by the Governor, for every urban area with a population of more than 50,000. MPOs are charged with making decisions on the specific transportation plans and programs that would best serve their metropolitan area and are comprised of local elected officials or their representatives, representatives from transportation agencies including transit providers and appropriate State officials including DOT.

The role of the MPO in managing the transportation planning process is to provide a fair and neutral forum for effective regional transportation decision making. The MPO ensures that the process includes the comprehensive consideration of all possible strategies to meet the transportation needs of the metropolitan area while addressing other important issues such as land use, air quality, energy, economic development and commerce. It also considers the broad spectrum of community viewpoints, and provides for the meaningful involvement of the public. Each MPO is required to develop a long range plan for its area as well as a program of projects according to federal guidelines on content, timing, and public involvement. By creating a vision for the region in the plan and by identifying projects and investments that help achieve that vision, the MPO ensures that scarce public funds are spent, moving the region towards its planning goals.

Outside of metropolitan areas, transportation plans and programs must be developed in consultation with affected local officials with transportation responsibilities. In such rural and small urban areas, DOT works closely with elected officials from counties, municipalities, towns, villages and organizations such as Regional Planning Development Boards to share information, discuss issues of mutual concern, and consider alternative approaches and projects. The recently updated 2006 Procedures for Consultation with Public Officials in Rural Areas is the State's documented process for involving and consulting with non-metropolitan public officials with transportation responsibilities.[7] Involvement of elected officials at all levels of government in both rural and urban areas is of great value. As representatives of their communities, they provide valuable input and an important influence on decision making. In addition,

[7] DOT. *Procedures for Consultation with Public Officials in Rural Areas*. 2006. https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/MPO_program_update_guide/repository/ruralconsult2006a1.pdf

there is communication between the State and Native American Tribal Governments on issues of mutual concern.

Notably, the demands on the transportation system are influenced a great deal by local land use decisions. While land use planning authority in New York fundamentally resides with local governments, the transportation sector plays a role in support of these efforts and works to ensure that the transportation implications of specific local plans are appropriately considered. In order to achieve greater energy efficiency within local and regional transportation systems, steps must be taken to better integrate land use and transportation planning.

For more information on transportation planning and transportation policies and priorities in New York, please refer to Strategies for a New Age: New York State's Transportation Master Plan for 2030.[8]

An overview of the State's transportation network follows.

3.2 Highways and Bridges

As of 2008, there were nearly 114,000 miles of road in New York. Of this number, nearly 15,000 miles are under the control of DOT. The rest are under the jurisdiction of counties, localities or other governmental agencies. Only about 27,500 miles of roadways are eligible for federal-aid, creating challenges in obtaining the funding to maintain the roads in New York in a state of good repair.[9]

As of April 2007, there were 19,514 bridges in New York (including 1,226 railroad bridges). Less than half (only 7,821) are under the jurisdiction of New York. Of the 19,514 bridges, 6,185 are rated as deficient[10] and 103 are closed.[11]

The highway system is used extensively, as shown in Figure 1. In 2008 about 366 million vehicle miles were driven on New York roads every day. Although declining over the last two years, that number has grown steadily over the long term, averaging about a 1.7% annual growth rate in the previous years. As shown in Figure 2, VMT over the planning horizon is expected to grow annually at about 1.1 percent, which is less than historical levels, and is then expected to decline in the post-2020 period. Use of the highway system in the New York City metropolitan area accounts for just under 50 percent of the statewide system usage. It has grown at a slower rate than the rest of the State and the growth rate is expected to become negative in the 2020 to 2025 time period, while the rest of the State's VMT continues to grow but at a rate of less than 1 percent. The negative growth rate in the metropolitan area may be at least partly attributable to forecasted constraints in the capacity of the transportation system in light of expected population and economic growth.

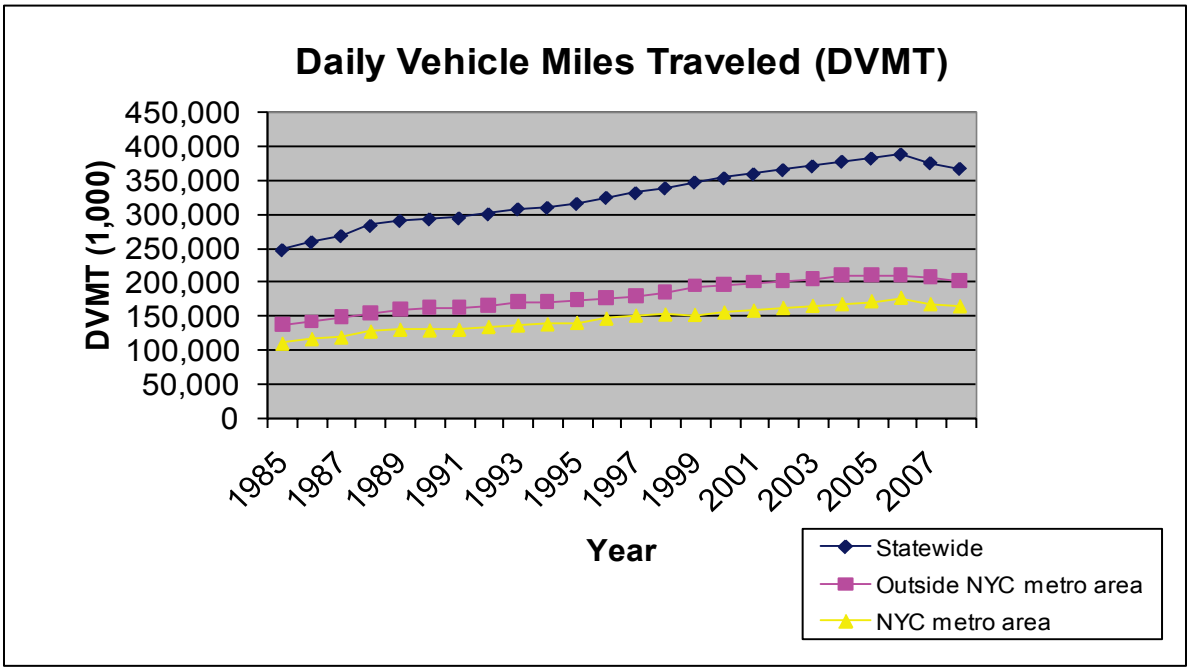
[8] DOT. *New York Statewide Master Transportation Plan*. 2006. www.nysdot.gov/main/transportation-plan/transportation-plan

[9] Nelson A. Rockefeller Institute of Government, *2007 New York State Statistical Yearbook*, *Table M-17*. 2007. http://www.rockinst.org/nys_statistics/2007/

[10] A deficient bridge is one whose structural condition has resulted in a degradation of its ability to function structurally in comparison to the bridge's original functional condition. Most bridges are designed with excess structural capacity and redundancy; therefore bridges classified as deficient, except for the most severe cases, are still capable of safe operation.

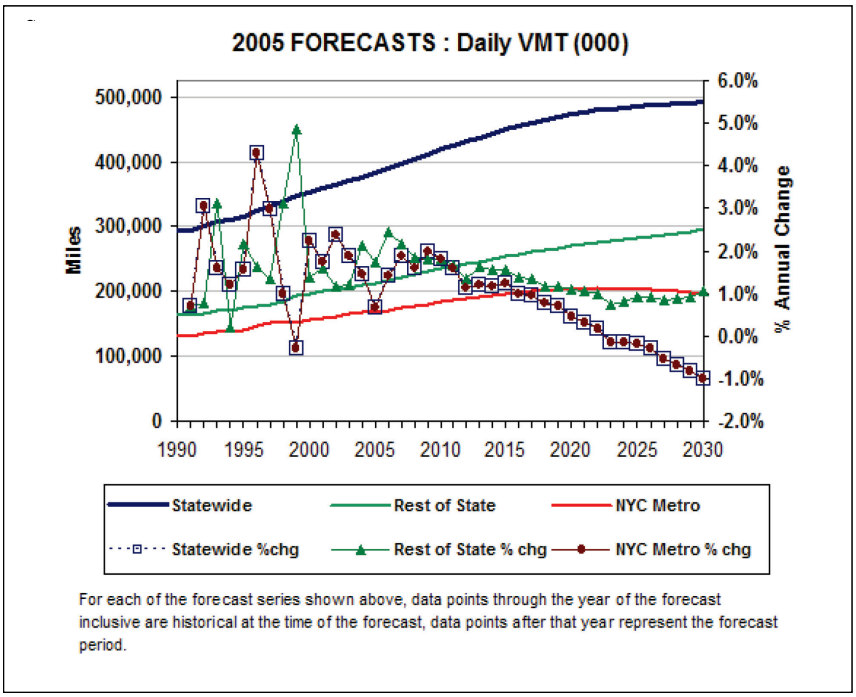
[11] Nelson A. Rockefeller Institute of Government, *2007 New York State Statistical Yearbook*, *Table M-197*.2007. http://www.rockinst.org/nys_statistics/2007/

Figure 1. Daily Vehicle Miles Traveled



Source: DOT, Highway Data Services Bureau

Figure 2. 2005 Forecasts: Daily VMT

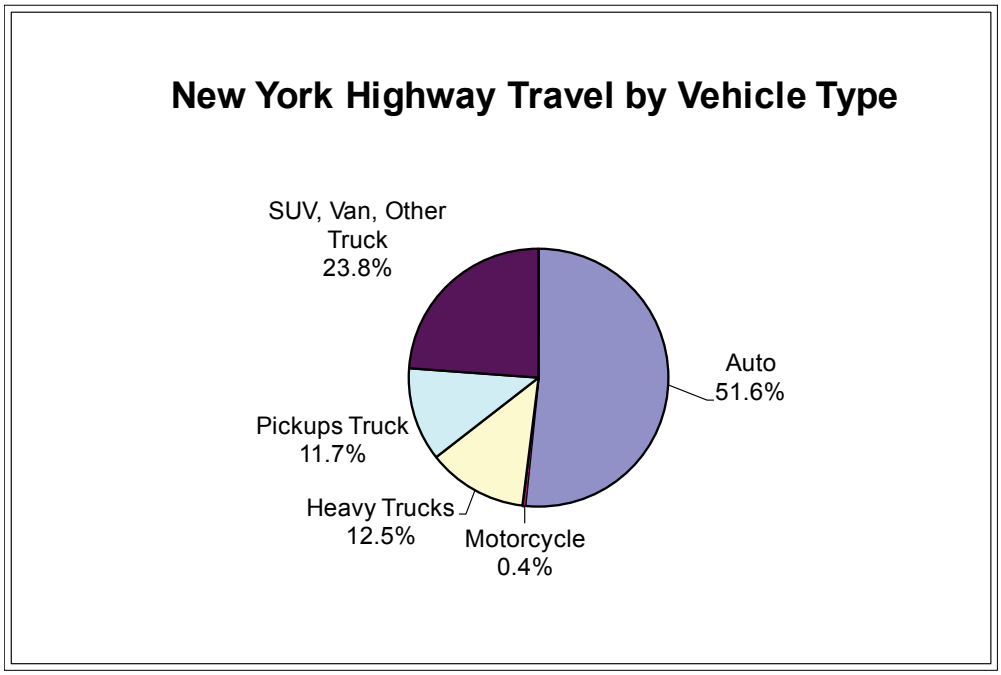


Source: DOT, System Performance and Asset Management Bureau

Many of the vehicles using the highway system exceed the posted speed limits, which leads to unnecessary fuel usage. When speeds are posted for 45 miles per hour (mph) or more, only about 40 percent of drivers are observing the speed limit, with 3.5 percent exceeding the speed limit by 15 mph. According to DOT Highway Data Services Bureau, for roads posted with speed limits of 55 mph or greater, only 38.5 percent observe the speed limit, while more than 5 percent exceed the speed limit by more than 15 mph.

New York has over 11 million licensed drivers who rely on the availability and functionality of New York's highways and bridges. There are approximately 10.5 million registered vehicles of various types. In 2006, revenue from vehicle registrations and driver's licenses was slightly above $1 billion. Figure 3 shows the distribution of vehicle travel by vehicle type. As would be expected, the majority of highway trips are taken by autos. However, light duty trucks (pickup trucks, SUVs, and vans) make up a substantial portion of trips. Heavy duty trucks are also prominent at 12.5 percent.

Figure 3. New York Highway Travel by Vehicle Type



Source: DOT, System Performance and Asset Management Bureau

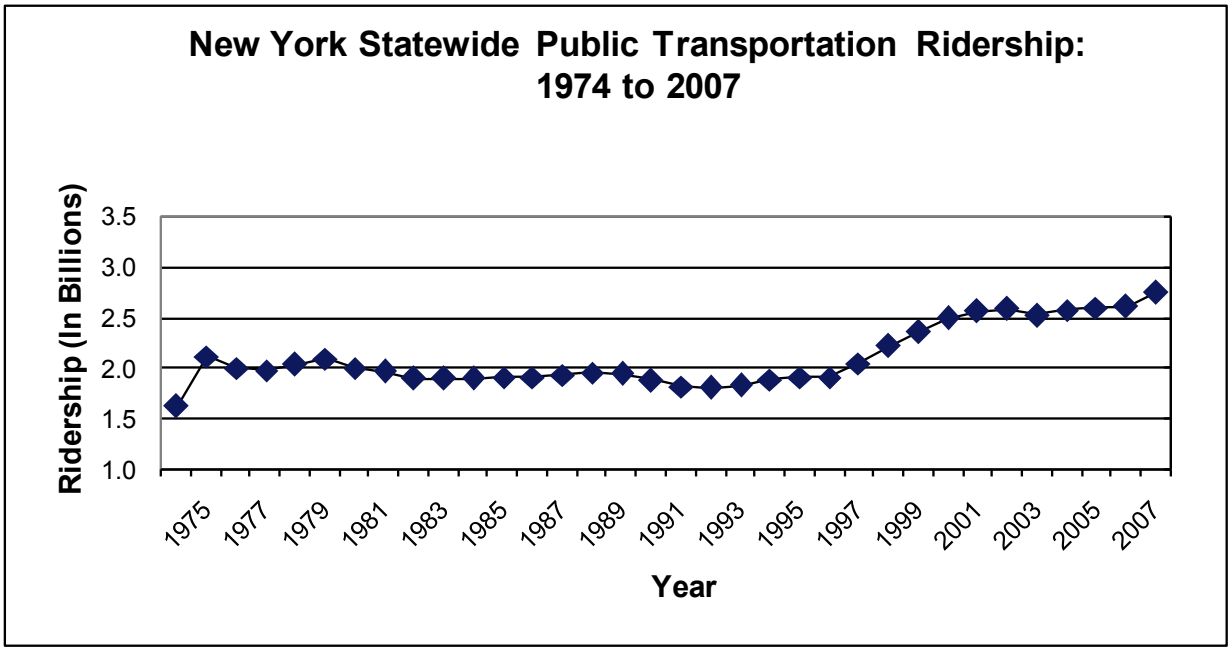
3.3 Public Transportation

New York is the heaviest user of public transportation in the nation. Approximately one-third of the nation's public transportation trips occur in the State. Most of those public transportation trips (about 97 percent) occur in the New York City metropolitan area where 50 percent of New York City residents use public transportation. Statewide public transportation ridership has hovered around 2.0 billion trips per year from the mid 1970's to the mid 1990's (see Figure 4). The jump in ridership that started in 1996 can largely be attributed in the downstate region to the introduction of fare discount cards, which allowed for free transfers within the public transportation system, as well as the heavy capital investment in the subway system. In 2007, statewide public transportation ridership increased by 130.1 million trips from

the previous year. Public transportation ridership is growing at an annual rate of 3.5 percent and is expected to continue at that rate through 2020.[12]

New York continues to experience an unprecedented increase in the utilization of public transportation. New York not only accounted for one-third of the nation's ridership, but in 2006, more than 32 percent of the increase in national public transportation ridership occurred within the State. Based on analysis provided by APTA, the average commuter who uses public transportation conserves approximately 200 gallons of gasoline annually when compared to driving alone.

Figure 4. New York Statewide Public Transportation Ridership: 1974 to 2007



Source: DOT, Public Transportation Bureau.

There are approximately 130 public transportation systems in New York providing bus, subway, commuter rail, light rail, paratransit and ferry services. Table 2 details the State's fleet profile.

[12] Cambridge Systematics, Inc. *Bottom Line Technical Report: Highway and Public Transportation National and State Investment Needs.* Prepared for AASHTO. 2009. http://bottomline.transportation.org/FullBottomLineReport.pdf

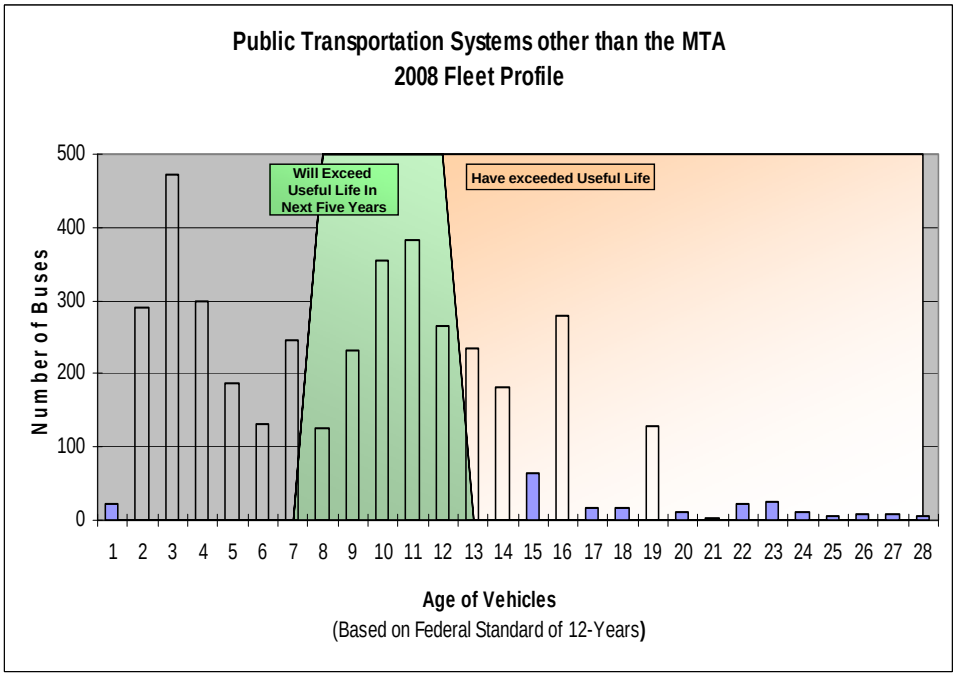
Table 2. New York Public Transportation Fleet

Type	Number
Buses (MTA)	4,562
Buses (Non-MTA)[1]	4,770
Paratransit Vehicles (Non-MTA)	521
Subway Cars	6,494
Rail Cars (MTA)	2,440
Rail Cars (Non-MTA)	27
Ferry Boats	135

[1] Includes MTA Long Island Bus and MTA Bus Company.
Source: DOT, Public Transportation Bureau.

The predominant mode for public transportation systems other than the Metropolitan Transportation Authority (MTA) is bus. There are approximately 5,291 public transportation buses and paratransit vehicles operated by systems other than the MTA. Of that total, 4,018 are full-size standard buses with a federally-rated useful life of 12 years. The current average age of the full-size standard bus fleet in New York is 8.2 years; 781 buses (19.4 percent) have exceeded the federally-recommended useful life. During the next five-year period, an additional 1,468 (36.5 percent) of the fleet will become eligible for replacement. Older buses cost more to maintain and are less energy efficient. Improving the average full-size standard bus fleet age in New York is one of the opportunities to improve energy efficiency and enhance fuel type diversity. The fleet age distribution for systems other than the MTA is shown in Figure 5.

Figure 5. Public Transportation Systems Other than the MTA



Source: DOT, Public Transportation Bureau.

New York's public transportation systems also provide specialized paratransit services – pursuant to the Americans with Disabilities Act (ADA) - for individuals with disabilities that, due to cognitive or physical limitations, cannot use regularly scheduled fixed-route public transportation services. According to DOT Public Transportation Bureau, in 2007, a total of 7.9 million passenger trips were provided on paratransit services.

New York also has an extensive ferry system. There are 52 ferry routes operated by approximately 20 providers, using 136 ferry boats docking at 68 landings. The ferry system in New York carries about 43 million passengers annually, of which the Staten Island ferry carries about 19.5 million passengers.

3.4 Rail

As shown in Figure 6, New York has one of the largest and most diversified rail systems in the nation. The rail system carries both passengers and freight over 4,200 miles of rail.[13]

Figure 6. Railroads of New York (2008)

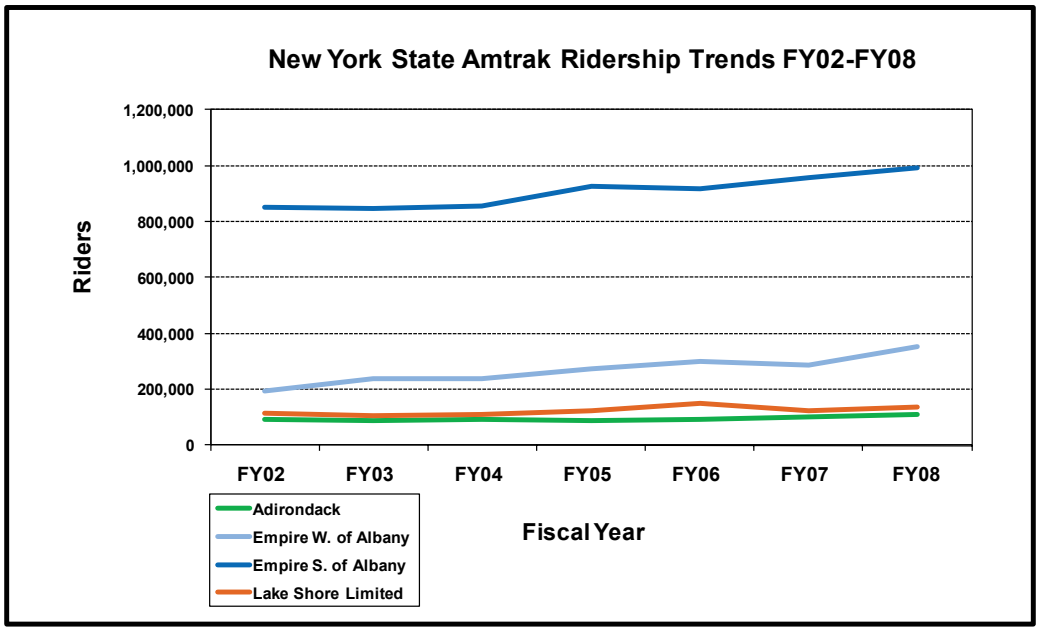
Source: DOT. *New York State Rail Plan.* 2009.

[13] DOT. *New York State Rail Plan.* 2009. https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan

For freight transportation, there are 36 railroads operating in the State. There are four Class I railroads (those railroads with annual revenues exceeding $319.3 million), with CSX being the largest, operating 1,099 route miles. Other Class I railroads operating in New York are Canadian Pacific Railway, Northern Southern Railway and Canadian National Railway. There are four Class II regional railroads (those with annual revenues between $40 million and $319.3 million or at least 350 operating route miles) and there are 28 Class III railroads (21 local railroads and 7 switching and terminal railroads), which perform local pickup and delivery or switching and terminal related activities.[14] In 2006, approximately 76.7 million tons of freight were shipped on New York's rails. The principal rail import is coal, while chemicals and waste and scrap are the chief exports shipped from the State by rail.

The rail system in New York also carries passengers, both on commuter railroads and on an inter-city basis. Inter-city and commuter rail services are heavily used in New York. Penn Station in New York City is the nation's busiest rail station, serving eight million passengers annually. Inter-city rail service is provided by Amtrak. Amtrak's Empire and Adirondack services carry 1.5 million riders annually. Figure 7 shows recent ridership trends in the State. Amtrak provides service to 25 stations in New York.[15]

Figure 7. New York Amtrak Ridership Trends FY02-FY08



Source: DOT. *New York State Rail Plan.* 2009.

New York has the two largest commuter railroads in the nation, Long Island Railroad (LIRR) and Metro-North Railroad (MetroNorth), both subsidiary corporations of the Metropolitan Transportation Authority (MTA). LIRR provides service between Nassau and Suffolk Counties and New York City. It is the largest and busiest commuter railroad in North America, carrying 86.1 million passengers in 2007; on an average weekday, it carries 290,000 passengers. Seventy-eight percent of the trips on LIRR are to and

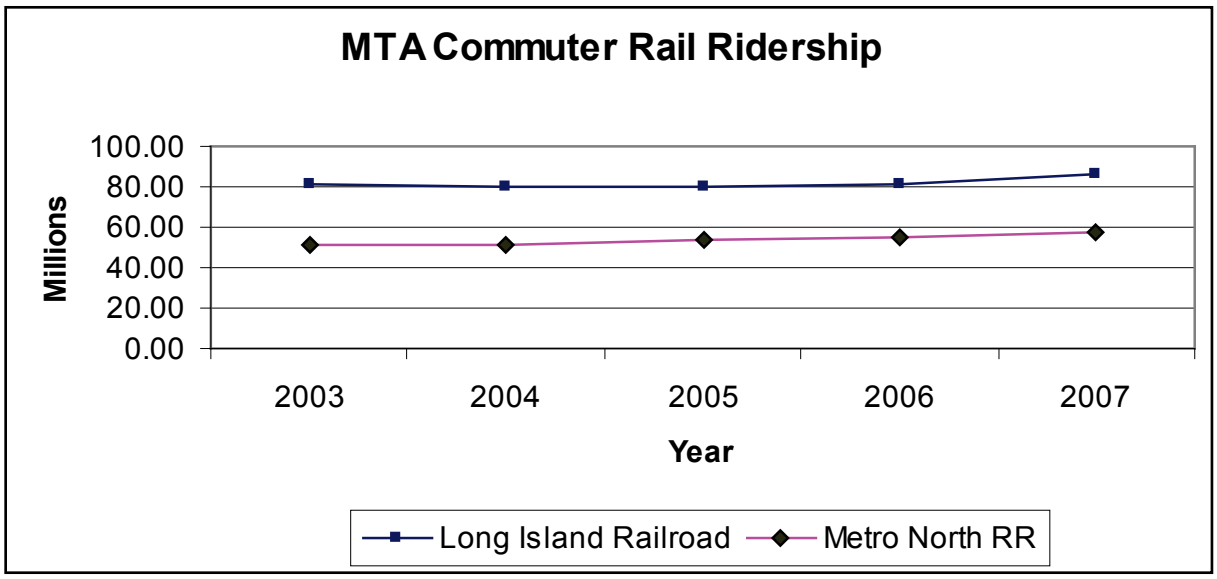
[14] DOT. *New York State Rail Plan.* 2009, https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan

[15] DOT. *New York State Rail Plan.* 2009. https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan

from Manhattan.[16] MetroNorth provides services from New York City's northern suburbs to Grand Central Station in Manhattan. It also contracts with New Jersey Transit to provide service to Orange and Rockland Counties.

As seen in Figure 8, on an average weekday, MetroNorth carries 278,000 passengers (80.1 million per year). Eighty-one percent of trips are to and from Manhattan. Ridership on both LIRR and MetroNorth is increasing annually.[17]

Figure 8. MTA Commuter Rail Ridership



Source: DOT. *New York State Rail Plan.* 2009.

3.5 Aviation

New York also has an extensive aviation system with 490 airports. Eighteen are commercial airports with the rest being public fields available for general use or private airports not open to the public. In addition, New York has about 150 heliports, gliderports and seaplane bases. In 2007, there were 45.5 million enplanements at New York airports (passengers boarding for a one-way trip). The State's airports also handled 3.3 million tons of air freight in 2006.[18]

[16] DOT. *New York State Rail Plan.* 2009. https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan

[17] DOT. *New York State Rail Plan.* 2009. https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan

[18] Federal Aviation Administration (FAA). Air Carrier Activity Information System (ACAIS) Database. http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/index.cfm?sect=collection

3.6 Waterborne Transportation

New York has a unique water transportation system, consisting of an extensive internal canal system, the international Great Lakes St. Lawrence Seaway System and a number of ports. There are four upstate ports: Buffalo, Albany, Oswego and Ogdensburg. Collectively, these ports handled 2.5 million tons of freight in 2007. The top five commodities were grain, cement, coal, limestone and salt. The canal system totals 524 miles in length with 57 locks, and connects the Hudson River with Lakes Champlain, Ontario and Erie, as well as the Finger Lakes. The canal system does carry some freight (13,200 tons in 2007), but is mostly known for its pleasure craft usage.

The St. Lawrence Seaway portion, the majority of which forms the border of New York with Canada, totals 189 miles in length between Montreal and Lake Ontario, with seven locks. As per the DOT Freight Bureau, in 2001, the St Lawrence Seaway System handled 47.4 million tons of cargo, down from 8.8 percent from 2006. The 4,450 vessel transits were down 3.5 percent from 2006. The top five commodities handled were grains, iron ore, other processed products, coal and salt. Pleasure craft also passed through the locks.

Downstate, the Port of New York and New Jersey handled more than 96 million tons of cargo in 2007, a slight increase (1.2 percent) from the previous year. Included in this tonnage total was a new record for containerized cargo totaling 5.3 million Twenty-foot Equivalent Units (TEUs), an increase of 4.2 percent over 2006. The total value of cargo through this port was $166.1 billion. The most frequent trading partner using the port was China.

3.7 Non-Motorized Transportation

Bicycling and walking are important elements of an integrated, intermodal transportation system. Constructing sidewalks, installing bicycle parking at transit facilities, teaching children to ride and walk safely, installing curb cuts and ramps for wheelchairs, striping bike lanes and building trails all contribute to the transportation goals of safety, mobility, economic growth and trade, and enhancement of communities and the natural environment. Furthermore, walking and bicycling are a means of transportation that are energy efficient, generate no air pollution, provide the health benefits of exercise and are consistent with compact traditional communities.

For these reasons, DOT, the MPOs, local governments and other agencies continue to work on improving the network of bicycle and pedestrian facilities across the State. These facilities range from sidewalks in cities and villages to shoulders for walking and cycling in rural areas to regional trail ways on their own rights-of-way. Since 1994, DOT has signed over 2000 centerline miles of cross-state bicycle routes, and actively encouraged local municipalities to link their signed bicycle routes to the State's system. For pedestrian mobility and safety, DOT has installed new or replaced existing sidewalks, and installed countdown signals and high visibility crosswalks at most of the urban intersections with high pedestrian volumes.

Since 1991, DOT has awarded over 343 Transportation Enhancement Projects (TEP) worth a total value of $326 million to improve the conditions of various bicycle and pedestrian facilities. However, since 1991 the total spending for bicycle and pedestrian projects still only constitutes approximately one percent of the total DOT transportation expenditure. While most state transportation departments have similar funding patterns for non-motorized transportation, concerns over congestion, emissions and energy use have prompted some states to further expand and improve their bicycling and pedestrian networks to encourage and enable more people to bike and walk to work, school, shops and recreation.

This can lead to more compact communities and reduced dependence on automobiles and less energy use and air pollution.

The emergence of certain initiatives such as Smart Growth and Complete Streets may also encourage more of a focus on bike and walking facilities.[19] Specifically, the Complete Streets initiative proposes to make streets accessible to users of all modes by balancing safety and convenience for everyone using the road. A network of complete streets improves the safety, convenience, efficiency and accessibility of the transportation system for all users.

[19] Information about Smart Growth and Complete Streets may be found at http://www.smartgrowth.org. See also the Draft Regional Collaboration Issue Brief prepared for this Plan.

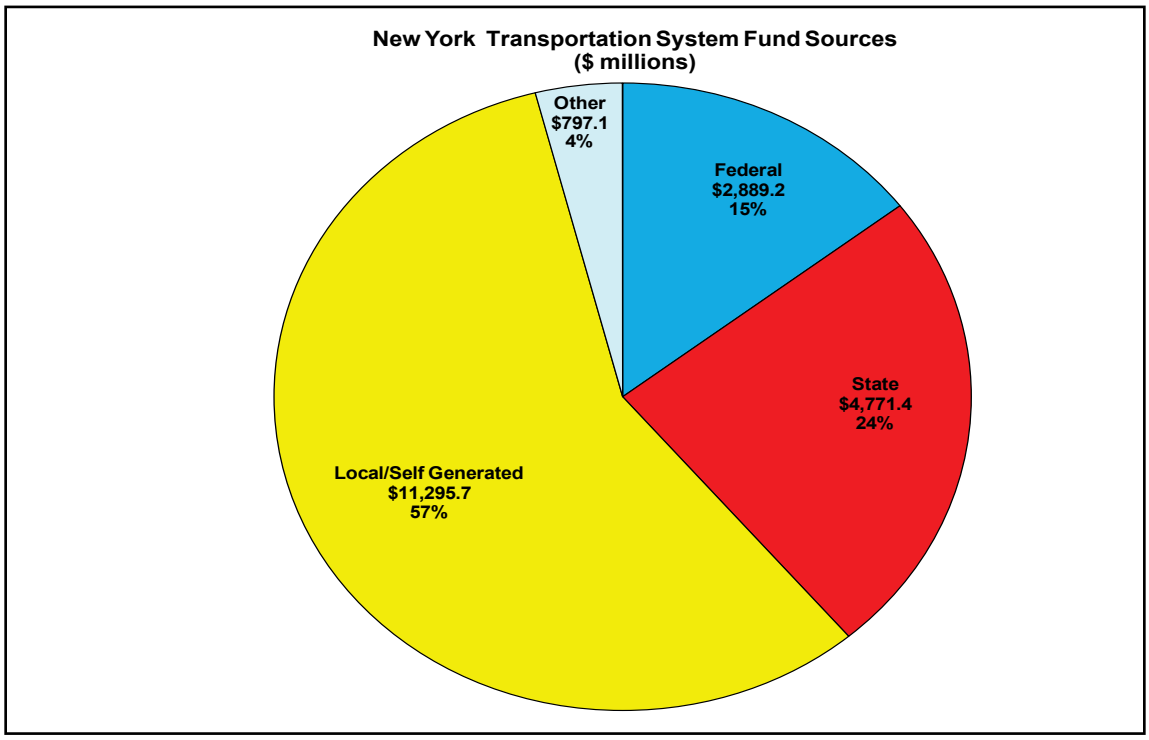
4 Transportation Statistics

Examining data concerning the use of the New York transportation network and its revenues and expenses can help to identify opportunities and challenges that the State will face over the planning horizon, and beyond, to reduce and transform the use of energy in the transportation sector.

4.1 Transportation Revenues and Expenditures

Figure 9 shows the current make up of transportation funding sources. The majority of transportation funding is self-generating or derived from local sources. Typically, only 15 percent of New York's transportation funds come from federal sources.[20]

Figure 9. New York Transportation System Fund Sources

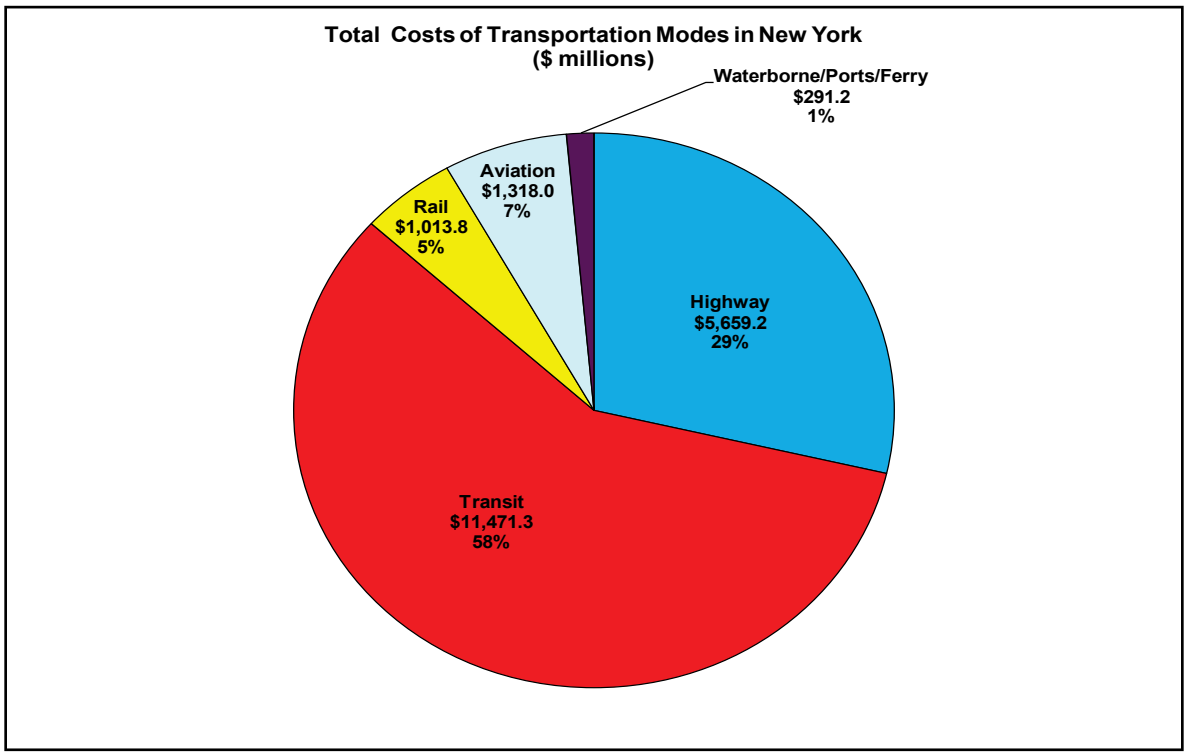


Source: DOT, System Performance and Asset Management Bureau.

Figure 10 shows that in New York, 58 percent of transportation funding supports public transportation and another 29 percent are spent on the highway system. The other modes receive a comparatively small amount of funding.

[20] Note: these figures do not include any additional infrastructure funding provided through ARRA.

Figure 10. Total Costs of Transportation Modes in New York

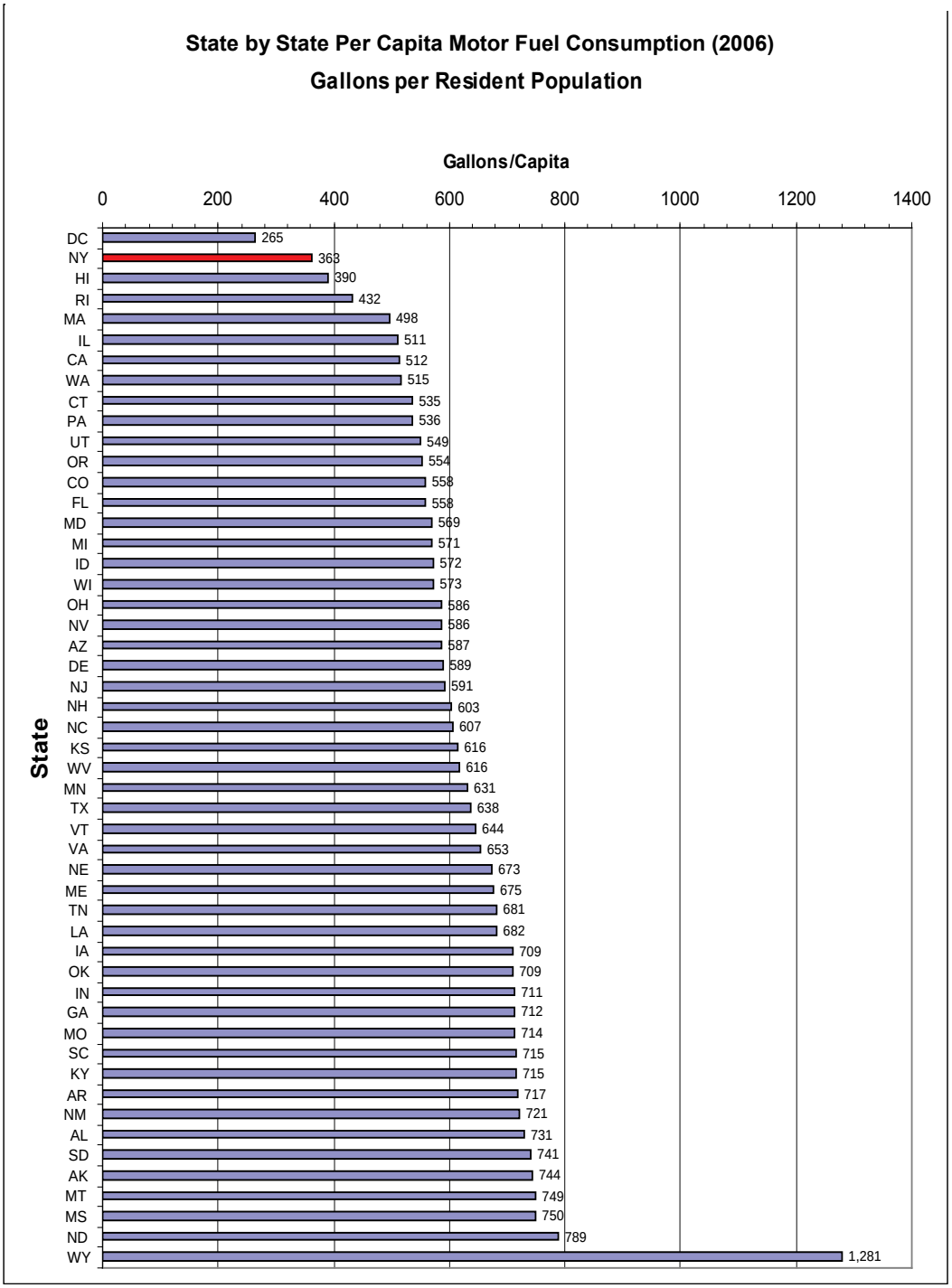


Source: DOT, System Performance and Asset Management Bureau.

4.2 Travel Trends

The transportation system in New York is the most energy efficient system in the nation due to the heavy use of public transportation, particularly in the downstate area. New York ranks first compared with other states in the lowest number of gallons of fuel consumed per capita (see Figure 11 for a comparison of New York with other states and the District of Columbia) as well as lowest VMT per capita. Table 3 shows the breakdown of daily trips by transportation mode compared to the rest of the nation. The use of autos is less in New York compared to national data with corresponding higher percentages of walking and public transportation usage.

Figure 11. State by State Per Capita Motor Fuel Consumption (2006)



Source: DOT, System Performance and Asset Management Bureau.

Table 3. 2001 Daily Person Trips

	Mode				
	Auto	**Walk**	**Transit**	**Other**	**Not Determined**
New York State	65.7%	20.1%	11.9%	2.1%	0.1%
Rest of U.S.	86.4%	8.7%	3.4%	1.4%	0.1%

Source: DOT, Office of Policy, Planning & Performance. National Household Travel Survey. 2001.

In 2001, New Yorkers took 24.9 billion trips representing 194.5 billion miles. Almost 11 billion of those trips were taken in personal vehicles. The average trip length was 8.2 miles and the average vehicle occupancy was 1.5 persons. A measure of the energy efficiency of the transportation system is VMT per capita in that it depicts the ability of the system to meet the mobility needs of the public based on the miles driven by a vehicle, and thereby consuming fuel. A lower VMT per capita indicates the transportation system is meeting mobility needs at a lower rate of fuel consumption as measured by miles driven. New York has had lower rates of VMT historically and the difference between New York and the rest of the country has grown over the years. For example, in 2000, New Yorkers drove about 30 percent less than the typical driver in the United States, compared to 25 percent less than in 1960. In other words, New York's transportation sector is energy efficient and has been getting more energy efficient with time, compared to the energy efficiency of the rest of the U.S., though there is further room for improvement.

The purpose of travel in New York is diverse. Figure 12 breaks down residential travel in New York by purpose, according to the 2001 National Household Travel Survey.[21] While the work-to-home commute is still important, other purposes comprise a large portion of travel in New York. Recreational, shopping and personal business trips represent a large share of travel. The diverse nature of residential travel in New York means that strategies to reduce VMT need to focus on both commuting and non-commuting trips in order to be effective.

[21] This survey is performed every five years and takes several years to compile the results, thus, the 2001 survey is still the most current.

Figure 12. 2001 Vehicle Miles of Travel by Purpose

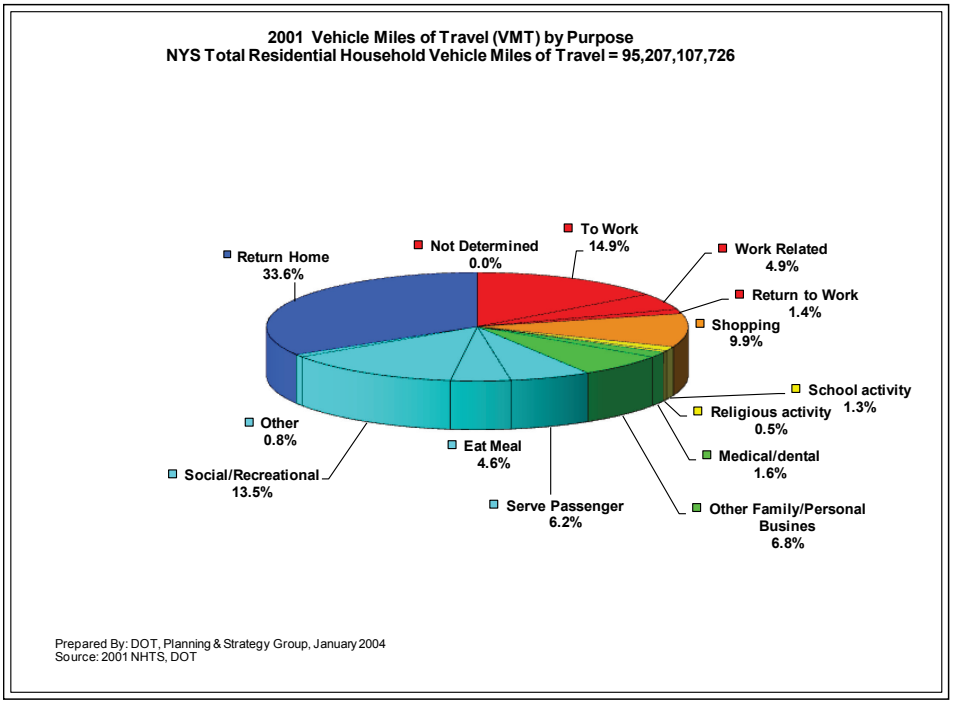
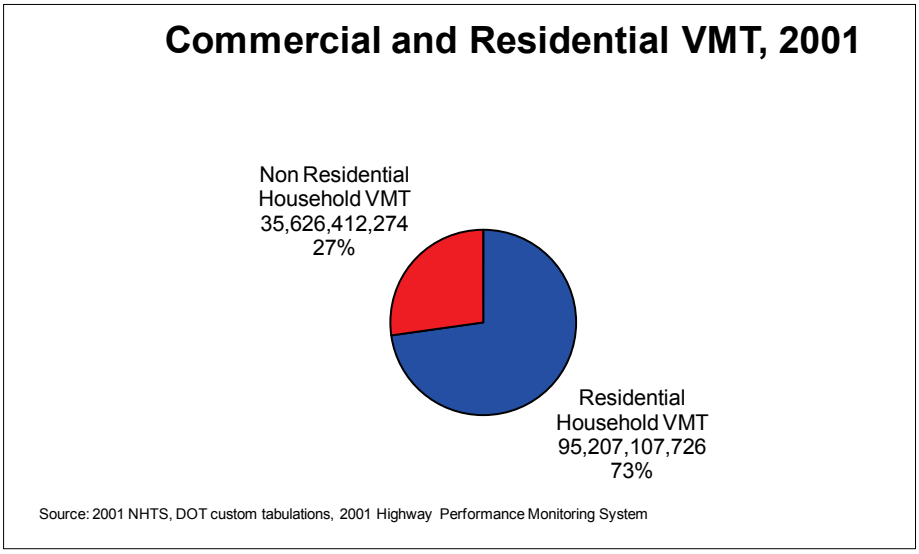


Figure 13 shows that residential travel represents 73 percent of travel in New York. Twenty-seven percent of travel is commercial travel, e.g. bus, truck, fleet, and tourist. This VMT is directly tied to economic activity such as commercial truck traffic or tourist buses. To provide multiple benefits to New Yorkers, e.g., transportation choices, quality of life, and air pollution benefits, strategies to reduce VMT should provide convenient and affordable options and be targeted to trip type and purpose.

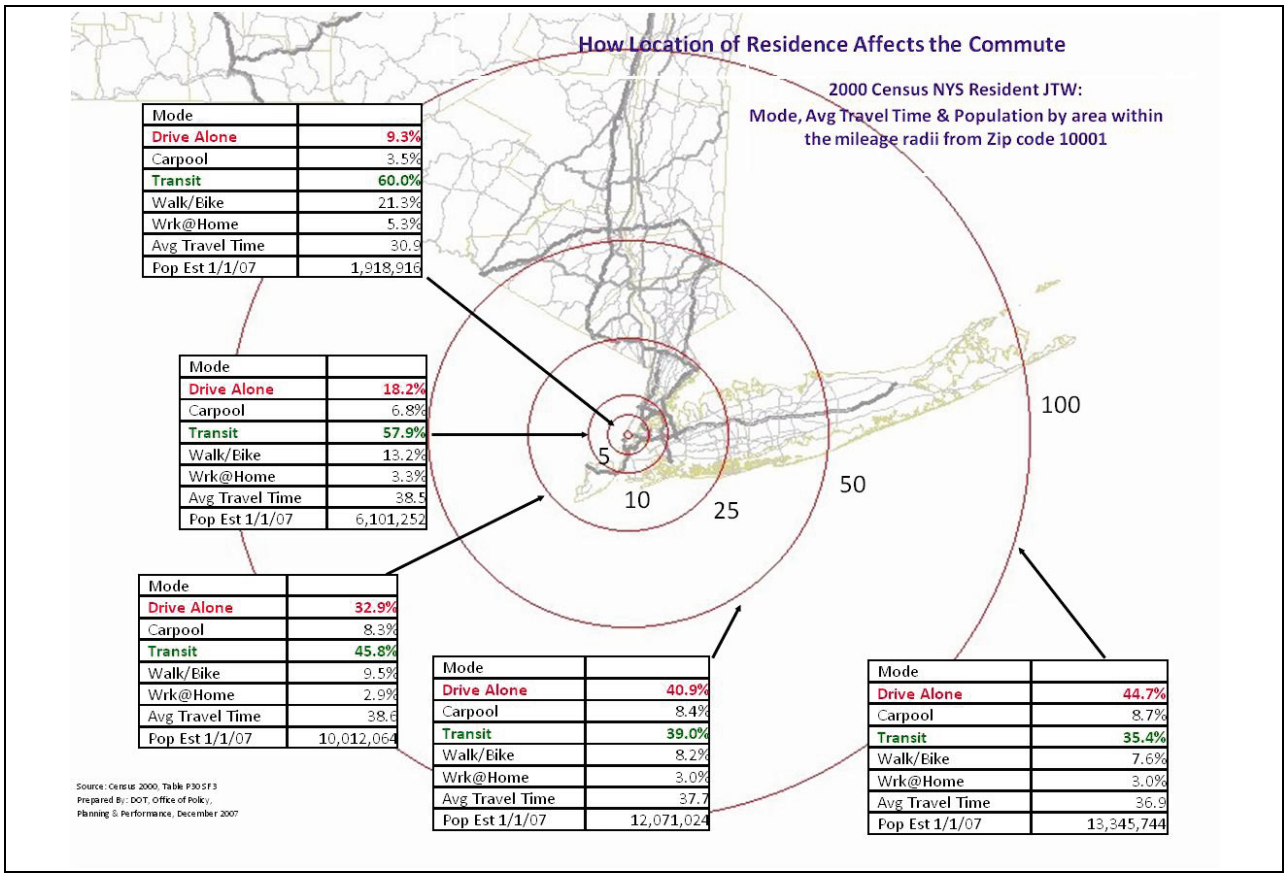
Figure 13. Commercial and Residential VMT, 2001



Prepared By: DOT, Planning & Strategy Group, Source: 2001 National Household Travel Survey (NHTS), 2001 Highway Performance Monitoring System (HPMS).

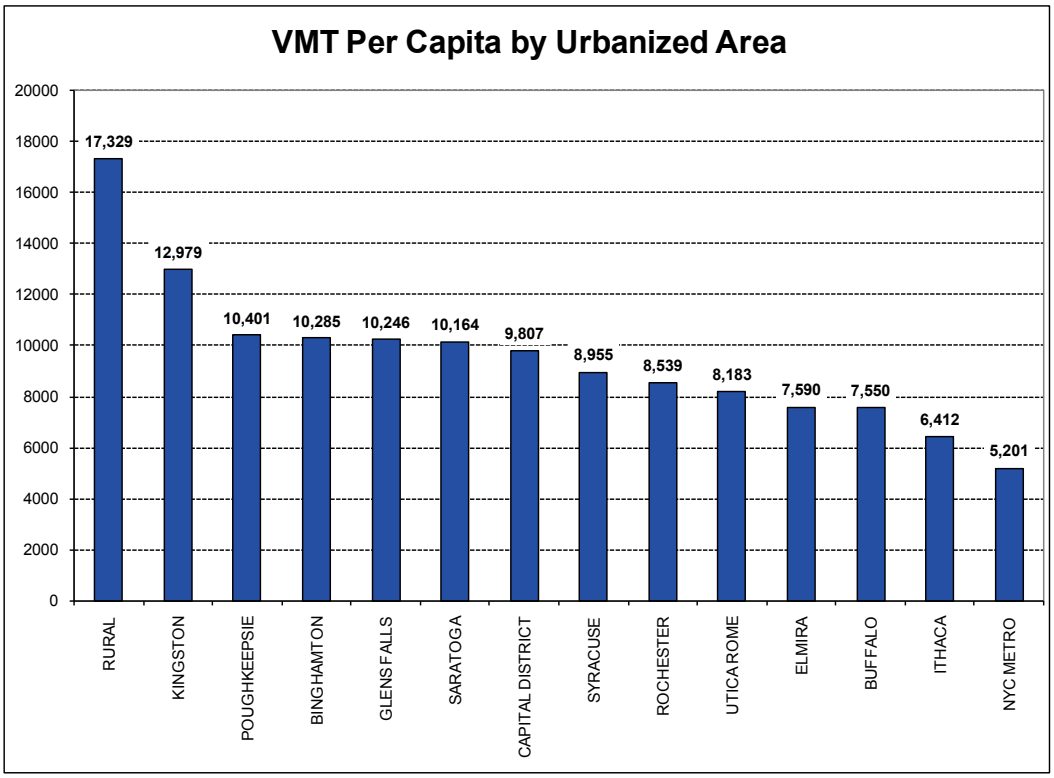
Location of residence and distance of home-to-work commute affects VMT as well as mode of travel. Figure 14 shows the distribution of commuting trips in the New York City area. This figure shows that as one's residence moves further outside of the urban core area, the public transportation and walk/bike percentages decline and more commuters choose to drive alone. This is further confirmed by Figure 15 and Figure 16, which show VMT per capita for various areas of the State and daily VMT for those same areas, respectively. Due to population distribution, the downstate area accounts for a large amount of VMT, however its per capita number shows that it is the most efficient part of the State. Conversely, a rural area will not have many VMT but its per capita share is large due to the small population. This reflects the effects of land use and public transportation availability on travel choices. Programs to revitalize urban cores, promote transit oriented housing, and enhance public transportation and other alternative modes will have a positive effect on total energy use by the transportation sector.

Figure 14. How Location of Residence Affects the Commute



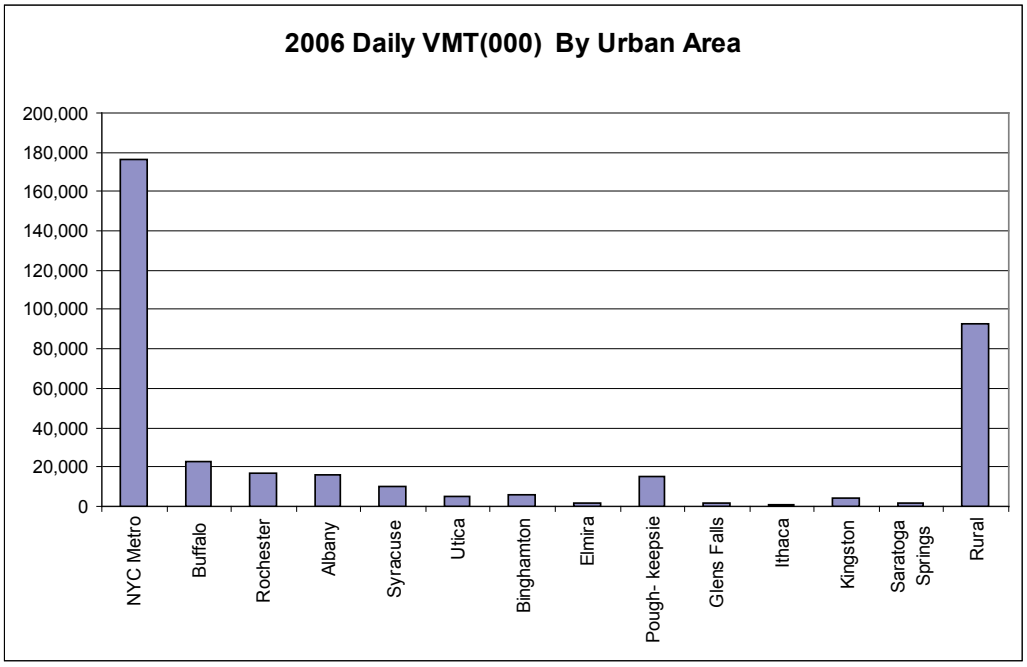
Source: Census 2000, Table P30 SF3
Prepared By: DOT, Office of Policy, Planning & Performance, December 2007.

Figure 15. VMT Per Capita by Urbanized Area



Source: Federal Highway Administration (FHWA) Statistics. Prepared by DOT, Office of Policy, Planning & Performance.

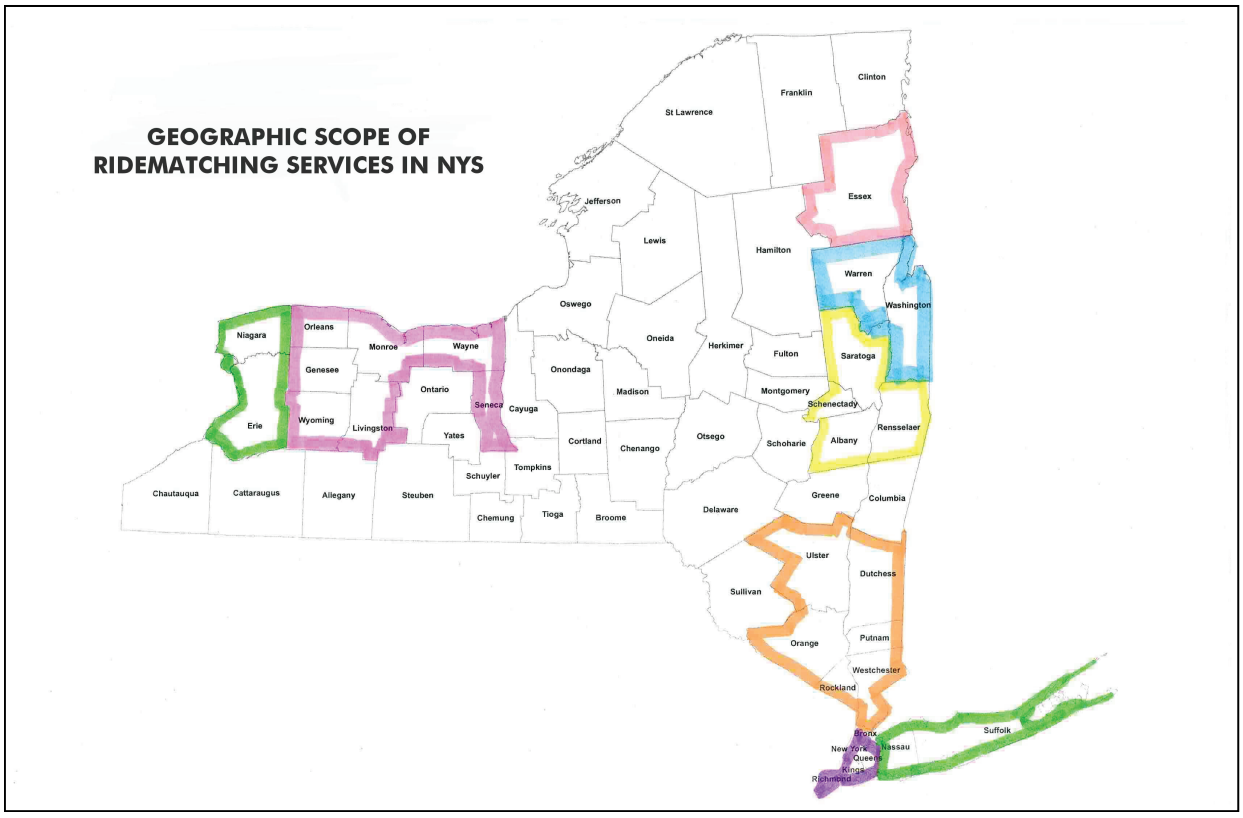
Figure 16. 2006 Daily VMT by Urban Area



Source: 2006 HPMS. Prepared by DOT, Office of Policy, Planning & Performance.

New York encourages modes of travel and commuting other than by single occupant vehicle. Based on the 2000 census, 9.2 percent of New Yorkers commute to work in carpools. New York encourages this by providing park and ride lots where commuters can park their vehicles and take public transportation or carpools to their final destination. Currently there are nearly 370 park and ride lots across the State, mostly in the New York City metro area but also in many other urban areas of the State. The number of park and ride lots is increasing over time as the State, various municipalities and even the private sector are developing additional park and ride lots. Many areas of the State offer ridematching services in which commuters can provide their origin and destination information to be matched with potential carpoolers. Figure 17 provides the geographic scope of ridematching services in New York. The colored lines represent the areas that have ridematching services.

Figure 17. Geographic Scope of Ridematching Services in New York State



Source: DOT

As travel has increased, the level of congestion, usually expressed as vehicle hours of delay has also increased. A major impact of congested travel is an increase in the amount of fuel used to make a trip, adversely affecting the energy efficiency of the transportation system. For 2007, DOT estimates that travel delays on the State highway system resulted in 417 million gallons of wasted fuel. If no action is taken to address congestion, the amount of wasted fuel is expected to rise to over 560 million gallons by 2013, an increase of 34 percent. Across the State, many actions have been taken to reduce the worsening congestion on New York's highways, but it remains a challenge, especially in urban areas. New York's transportation capital and operating programs contain many congestion mitigation measures. Estimates from the most recent capital program (for the five-year period from State Fiscal Year (SFY) 2007/2008

through SFY 2011/2012) indicate that these congestion mitigation measures would reduce the growth of vehicle hours of delay by almost 120,000 hours per day. This results in a fuel savings of 45 million gallons annually, a savings of more than 8 percent, compared to the fuel wasted under the "no-build" projection, i.e., no measures were taken.

The cost of congestion to New York's residents is high, including unnecessary extra vehicle wear and tear, lost time, increased fuel use, increased delivery costs and increased stress. It is estimated that congestion on State-owned highways cost New Yorkers $9.6 billion in 2007. If nothing is done to ease congestion, and assuming typical growth rates and current fuel prices, the costs of congestion could potentially rise to $12.8 billion by 2013. These figures do not include travel delays on roads owned by local governments, which generally have lower traffic volumes.

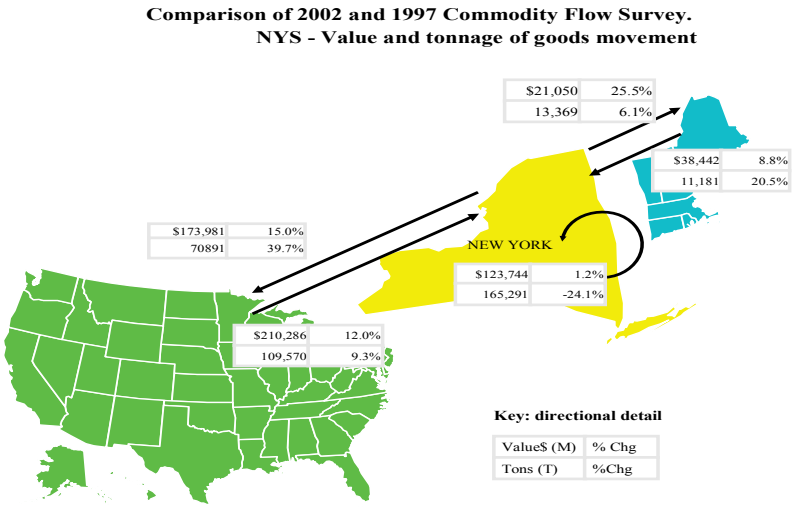
4.3 Freight and Intermodal Transportation

Freight and intermodal transportation is a critical element of transportation in New York. The shipment of freight and its safe, on-time delivery is a key economic activity indicator. Freight is shipped by different modes in New York. While freight on trucks is the most common mode, some freight undergoes shipment by more than one mode. Commodities may be shipped by rail, water or air, but typically complete the journey to the customer by delivery truck. Intermodal transportation takes advantage of the flexibilities and efficiencies that are specific to each mode. Freight shipments by truck are the predominant mode for freight originating in New York in terms of distance travelled (66.7 percent) and weight (90.3 percent), based on 2002 data.[22] When examined on a value basis, a larger percentage of freight is shipped by parcel mail, reflecting the timeliness and security needs for shipments of higher value products. This dependence on truck shipments by freight is expected to continue relatively unchanged through 2030.

Figure 18 shows the trends in freight in New York by comparing freight movements in and around New York between 1997 and 2002. In 2002, 370.3 million tons of freight either originated in or came into New York at a value of $567.5 billion. Continuing previous trends, the value of goods originating in New York increased while the tonnage decreased, reflecting the decrease in heavy raw materials, which have a high tonnage but a lower value relative to higher value goods, e.g., electronics. Both the value and tonnage of goods shipped to New York increased over this period.

[22] U.S. Census Bureau. 2002 Economic Census, Transportation – Commodity Flow Survey. http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ECN&_tabId=ECN2&_submenuId=datasets_4&_lang=en&_ts=275396632364

Figure 18. Comparison of 2002 and 1997 Commodity Flow Survey



NYS Commodity Flow	Value $ (000.000)	Value $ (000.000)		Tons (000)	Tons (000)	
Combined Shipment Direction	2002	1997	% Chg	2002	1997	% Chg
Originating In NYS						
To Other States	195,031	168,049	16.1	84,260	63,338	33.0
To Within NYS	123,744	122,301	1.2	165,291	217,676	-24.1
Total	318,775	290,350	9.8	249,551	281,014	-11.2
Originating Outside NYS						
To NYS	248,728	223,016	110.2	120,751	109,555	10.2
Total NYS	567,503	513,366	10.5	370,302	390,569	-5.2

Source: DOT, System Performance and Asset Management Bureau

4.4 Emissions

Transportation is heavily dependent on petroleum for its energy. In 2007, the transportation sector in New York consumed 1,178.6 trillion British thermal units (BTU) of primary energy, i.e., direct consumption, not based on subsequent energy use. Of this amount, 1,152.2 trillion Btu (97.8 percent) were derived from petroleum products.[23] In 2007, 7.1 billion gallons of motor fuel were purchased in New York, 5.7 billion gallons of gasoline and 1.4 billion gallons of diesel fuel.[24]

Combustion of petroleum products has environmental consequences, primarily by producing air pollutants that affect air quality and public health, and contribute to climate change. In 2007, on-road vehicles were the source of approximately 78 million tons of carbon dioxide, or 31 percent of total carbon dioxide emissions, and the entire transportation sector accounted for 37 percent of the carbon dioxide emitted in New York.[25] Table 4 shows emissions of other pollutants from on-road sources. On-road

[23] NYSERDA. *Patterns and Trends - New York State Energy Profiles: 1993-2007*. 2009. Table 1-2. http://www.nyserda.org/energy_information/patterns%20&%20trends%201993-2007.pdf

[24] DOT. Historical Travel Trends in New York State. May 2009. https://www.nysdot.gov/divisions/policy-and-strategy/darb/dai-unit/ttss/repository/Trends.pdf

[25] NYSERDA, based on, "New York State Greenhouse Gas Emissions Inventory and Forecasts for the 2009 State Energy Plan," final draft dated June 25, 2009. DOT, Environmental Science Bureau.

sources are at least partly contributing to several non-attainment designations (those areas in which National Ambient Air Quality Standards (NAAQS) for one or more air pollutants are not met) in New York. Currently, the ten-county downstate area is in non-attainment for particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and Manhattan is in non-attainment for particulate matter less than 10 microns in diameter (PM_{10}). There are eight non-attainment areas for ozone in New York, covering 29 counties and one partial county. Of New York's population of 19.3 million residents, 16.5 million live in non-attainment areas.[26]

Table 4. 2007 Statewide On-Road Emissions (tons per year)

Pollutant	Emissions
Direct PM_{10}	6,749
Direct $PM_{2.5}$	4,232
NO_X	213,871
VOC	124,506
CO	1,850,358

Source: DOT, Environmental Science Bureau

To reduce emissions from mobile sources, New York has adopted several emission control strategies in various State Implementation Plans (SIPs). SIPs are states' roadmaps to achieve and maintain the NAAQS. As a result, New York has adopted low-emission vehicle (California cars) requirements, emission inspection and maintenance and on-board diagnostics programs and various cleaner fuel requirements. These measures have proven cost effective in reducing emissions from the transportation sector. In addition to coordination with the State Energy Plan, the SIP is coordinated with the Statewide Master Transportation Plan.

[26] See Health and Electricity Production and Energy Use Issue Brief for a complete discussion of non-attainment areas in New York State.

5 The "Three-Legged Stool"

The transportation, energy and emissions relationship can be described as a "three legged stool," where vehicle technology is one leg, the fuels used to power vehicles is the second leg of the stool, and transportation system activity is the third leg. Transportation system activity includes VMT, congestion relief measures and efficient links between modes of transportation. To improve the energy efficiency of the system and to reduce its carbon footprint, all three "legs" of the stool must be addressed.

The following sections of this Issue Brief describe how New York, working at the federal, State, regional and local level can realize substantial improvements in the energy efficiency of the transportation sector. They discuss transportation policies and programs that are evolving to better align with the State's policies related to economic growth, public health, energy independence, environmental sustainability and climate change mitigation. This evolution applies to all transportation modes in the State including rail, waterborne and aviation, as well as highways and public transportation.

5.1 Leg 1 - Vehicle Technology

5.1.1 Electrification of the Transportation Sector

The transportation system in New York is highly petroleum dependent, with 98 percent of the energy used by the sector derived from petroleum fuels.[27] This dependence poses several difficulties related to climate change, air quality and public health, security, economic growth and reliability. While petroleum will continue to be used extensively in the transportation sector for the planning horizon of this Energy Plan, alternative fuels will be used to transition away from petroleum. Ultimately, if a policy determination was made as to the most appropriate energy source to supply the majority of the transportation sector's energy needs, the State may be in a better position to realize its energy objectives.

New York should begin to move toward wider use of electrification in the transportation sector. This effort should start with on-road vehicles, such as plug-in hybrid vehicles and truck stop electrification for heavy duty vehicles as well as ancillary equipment in other modes (ground support equipment at airports, hybrid switcher locomotives at rail yards and cold ironing at ports). Longer term research and development should be supported and enhanced that will lead to deployment for other vehicle types in all transportation modes. The State should work with other states and regional and national groups to encourage electrification of the transportation system at the national level; the regional and national aspects of the transportation system make this an imperative. In the interim, the State must take steps to diversify its transportation fuels.

During the planning horizon of the Energy Plan, electrification of the light duty fleet can begin with plug-in hybrid vehicles. One assessment by the Pacific Northwest National Laboratory estimated that 84 percent of the current national light duty fleet could be supported by the current electric infrastructure

[27] NYSERDA. *Patterns and Trends - New York State Energy Profiles: 1993-2007*. 2009. http://www.nyserda.org/energy_information/patterns%20&%20trends%201993-2007.pdf

under certain vehicle charging scenarios.[28] The integration of plug-in hybrid electric vehicles (PHEVs) into our nation's vehicle fleet appears to be a viable part of the solution to our nation's dependency on foreign oil as well as curbing greenhouse gas (GHG) emissions. Some of the challenges associated with PHEVs include the impact PHEVs will have on the electricity grid, high prices, and battery technologies which are economic, safe, and can hold a significant charge. In recent years, many businesses, environmental groups, utilities and government agencies have explored such issues leading to developments which are accelerating PHEVs' acceptance into the consumer auto world. Experts believe the commercial success of PHEVs will depend on aggressive marketing and development by automakers and efforts by utility companies and government agencies.

A particular feature of PHEVs has attracted the interest of electric utilities: Vehicle-to-Grid (V2G) power. In a V2G scenario, PHEV owners would be able to "sell back" electricity acquired from the grid when their PHEVs are plugged in at home. For example, many fully charged PHEVs plugged in during peak electricity-use hours could provide ancillary power to the grid when electricity demand is high. To make V2G a possibility, grid infrastructure changes would be required. Grid operators would need to have the capabilities to communicate with PHEV on-board computers and to coordinate when electricity will be tapped from PHEVs.

Nearly every major auto manufacturer is preparing a PHEV for introduction to the consumer market. With increased collaboration among auto manufacturers, utilities, government and businesses, PHEVs appear to be a promising solution to internal combustion engine vehicles. As more research and development is completed, designs will become more effective, energy efficient, and inexpensive.

PHEVs will likely serve as a technology bridge to fully electric vehicles and a largely electrified transportation sector. Currently, dedicated electric vehicles are viable for niche applications such as limited delivery and support. As battery technology evolves and production increases, they will likely become useful in other transportation applications.

PHEVs in the nearer term may have an impact on electric utilities and the demand for power. The New York State Energy Research and Development Authority (NYSERDA) plans to examine the potential effect of these vehicles on the electric grid. This study will assess the energy, environmental and wholesale market electricity price impacts of PHEVs in New York, concentrating in the downstate area and examining a number of different PHEV penetration scenarios.

5.1.2 Corporate Average Fuel Economy Standards

A cost effective way to reduce fuel consumption and GHG emissions from the transportation sector is through tightening of the fuel economy standards for on-road vehicles.

Beginning with the oil crisis of the early 1970's, passenger automobile fuel economy has been a significant energy issue in the transportation sector. The authority to administer a program for regulating new passenger and light-truck fuel economy standards was delegated to the U.S. Secretary of Transportation by the Motor Vehicle Information and Cost Savings Act of 1972. In 1975, the Energy Policy and Conservation Act established the Corporate Average Fuel Economy (CAFE) standards. These standards were initially implemented for all passenger cars in 1978 and for light duty trucks in 1979. CAFE standards for passenger cars were established at a minimum level of 27.5 miles-per-gallon (mpg) for model year (MY) 1985 and have been frozen at that rate. Light duty truck standards have been frozen

[28] Kintner-Myer, M., Schneider, K., & Pratt, R. *Impacts Assessment of Plug-in Hybrid Vehicles on Our Electric Utilities and Regional U.S. Power Grids,* 2007. Pacific Northwest National Laboratory

at the 1996 rate of 20.7 mpg and increased gradually to 22.2 mpg for MY 2007. The Energy Independence and Security Act of 2007 revised those standards. Starting in model year 2011, CAFE standards gradually increase for light duty vehicles and trucks until a national fuel economy standard of 35 mpg is reached by 2020. This year the Obama Administration proposed rules to require passenger cars to reach a 39 mpg fuel economy standard by 2016 and 30 mpg for light trucks and sport utility vehicles. This results in an overall fuel efficiency standard of 35.5 mpg.

Nationally, the transportation sector contributes nearly a third of the U.S. greenhouse gas emissions and there is a pressing need to reduce these emissions to slow the rate of climate change caused by human activity. Recognizing the historic steps taken by the Obama Administration, New York believes that even more can be achieved through a collaboration among NHTSA, vehicle manufacturers and others to establish a more aggressive standard and timetable for future CAFE standards. NHTSA should consider a standard that is equivalent to the "Technology Exhaustion" alternative for light duty trucks and the "Total Costs Equal Total Benefits" alternative for passenger cars, as described in the recent Environmental Impact Statement on CAFE standards prepared by NHTSA. This would produce a fuel economy standard of 43.3 mpg for light duty cars and 34.7 mpg for light trucks.

The most likely scenario to meet tighter CAFE standards is through increased market penetration of hybrid-electric passenger cars and light duty trucks. Hybrid vehicles have become more popular with time. In May of 2007, hybrid sales nationwide reached over 47,000 vehicles. As PHEVs are manufactured and become generally available to the public, they are expected to replace hybrid vehicles as the predominant vehicle technology. As battery technology is developed and costs moderated, eventually battery vehicles are expected to prevail.

New York has supported clean vehicle technology previously and should continue to do so. For example, New York operates the Clean Vehicle Pass program on the Long Island Expressway. Under this program, owners of vehicles that are very energy efficient and clean (45 mpg fuel rating and super low emissions (SULEV) receive a sticker entitling them to use the high-occupancy vehicle (HOV) lanes although the vehicle may have only one occupant. According to the Department of Motor Vehicles, this very popular program has issued over 7,000 stickers since March 2006 and use of these vehicles in HOV lanes has increased by about 4 percent every month. This program's federal statutory basis expired in September 2009. The State is seeking extension of the federal legislative provision that will provide a continuing basis of the program.

5.1.3 Transportation Energy Research and Development

To encourage deployment and use of innovative, energy efficient transportation energy technologies and products, the State is supporting research, analysis and development, from both a policy and technical perspective. These efforts start with innovative technology development, continue to demonstration and verification and include both business and end-user assistance.

New York has already taken a leadership position in one transportation research area through the New York Battery and Energy Storage Technology Consortium (NY BEST Consortium). The NY BEST Consortium is a collection of New York universities and companies that will advance the commercialization of battery and energy storage technologies. Advancing such technology and developing products will reduce emissions and transform the transportation and renewable power generation sectors, while positioning New York as the leader in energy storage technology research, development, and manufacturing. In addition, NYSERDA and DOT have jointly sponsored several research projects to examine potential strategies to make the transportation system more energy efficient as well as reduce VMT.

5.2 Leg 2 - Transportation Fuels

5.2.1 Status of Alternative Fuels in New York

The use of alternative fuels in the transportation sector in New York has enjoyed success, but also faces several challenges. As discussed below, each alternative fuel has uncertainties associated with infrastructure, availability, efficiency or environmental effects. There are four basic criteria for evaluating alternative fuels: which fuels are (1) most cost effective, (2) able to relieve our dependence on foreign sources, (3) viable for the short and long term, and (4) able to provide improved environmental performance relative to petroleum. Fuels in general, including transportation fuels, should have an acceptable energy content yet be low in carbon.

New York has been "fuel neutral" in that the State has not favored one alternative fuel over others. However, in order for New York to move away from its petroleum dependency in the transportation sector, the State may need to determine which alternative mode of propulsion will best meet its needs to operate and maintain an efficient transportation system while adhering to climate change and other environmental priorities. Emphasis should be on reducing petroleum consumption and improving emissions through the use of fuel and vehicle efficiency technologies (including idle reduction equipment). A fuel neutral policy does not provide a market signal to the private sector to make purchases in vehicles, and invest in infrastructure. It also raises the likelihood for unnecessary and duplicative expenditures by both the public and private sectors in developing technology and infrastructure for multiple fuels. The State, giving due consideration to the benefits and costs of various alternatives, and in consultation with private sector entities, should at some point in the near future provide the market signal as to which alternative fuel best meets the State's goals of energy efficiency, energy independence, environmental sensitivity and transportation reliability. Greater use of electricity as a prime means of propulsion in the transportation sector may be the optimal solution.

5.2.2 Public Sector Programs

New York has been a leader in developing and adopting transportation programs and technologies that improve energy efficiency and air quality. The Clean Fueled Vehicles Council (CFVC), chaired by the Office of General Services, has been a major force in acquiring alternative fuel vehicles and developing the supporting fuel infrastructure necessary to support its own fleet of vehicles.[29]

The CFVC led the development of fueling infrastructure to support dedicated electric vehicles, compressed natural gas (CNG) vehicles, propane vehicles, and biofuel vehicles including ethanol (E-85), and biodiesel. Through the Council's efforts, the State's alternative fueled vehicle fleet has grown from 383 vehicles acquired during the first year of the Council's existence in 1998 to 8,529 vehicles as of September 2008, which represents 57 percent of the State's light duty vehicle fleet. The Council has also supported CNG and diesel dual-fuel vehicles and biodiesel infrastructure for the heavy duty fleet. The CFVC was instrumental in establishing the CNG and ethanol fueling infrastructure to support the State

[29] Clean Fueled Vehicles Council Member List: Department of Agriculture and Markets, Department of Correctional Services, Department of Environmental Conservation, Department of Motor Vehicles, Department of Taxation and Finance, Department of Transportation, Division of Budget, Empire State Development Corporation, New York Power Authority, New York State Energy Research and Development Authority, New York State Thruway Authority, Office of Children and Family Services, Office of General Services, Office of Mental Health, Office of Mental Retardation and Developmental Disabilities, Office of Parks, Recreation, and Historic Preservation, and the State University of New York.

fleet. By 2007, there were a total of 60 State-funded CNG fueling sites. Through the CFVC, the State has assisted in building six E-85 fueling sites.

The CFVC has also been instrumental in ensuring the proper biodiesel mixtures are available on the Office of General Services' statewide contract for State agencies to purchase in place of regular diesel fuel, enabling them to comply with Executive Order #142, which requires the use of biodiesel in State fleets and in State facilities that use heating oil.

The CFVC has been recognized by the U.S. Department of Energy and industry as a "best practice" to provide leadership and resolve issues related to alternative fuel vehicle deployment. Due to this demonstrated success, New York was selected by American Honda Motor Company to be the only state in the Northeast to receive a prototype Honda FCX hydrogen fuel cell vehicle for cold climate testing in the United States. The potential of hydrogen as a transportation fuel has not been sufficiently studied and may have a long-term role to play in transportation.

New York's public transportation fleets have also led in the use of alternative fueled vehicles. New York's support for the testing and deployment of alternative fuel vehicles in public transportation fleets dates back to the 1991 State-sponsored consortium of public transportation systems interested in alternative fuel development. In 2005, voters approved the Rebuild and Renew New York Transportation Bond Act. The Bond Act includes a five-year $50 million capital program for public transportation systems (other than the MTA) to address the incremental cost associated with mainstreaming hybrid-electric buses into public fleets as well as continuing to support the implementation of compressed natural gas (CNG) for those systems that have previously committed to and invested in CNG facility and infrastructure modifications. Leveraging the funding provided pursuant to the Rebuild and Renew New York Transportation Bond Act with existing or programmed federal and local funds will allow for the purchase of approximately 250 hybrid-electric and CNG vehicles. The incorporation of alternative fuel buses into public transportation fleets statewide has steadily increased since the initial State pilot consortium in 1991 from 31 to approximately 2,100 alternative fuel buses in service in 2008. Of the nearly 9,000 buses owned by public transportation operators, 13 percent are powered by CNG, while 9 percent are diesel electric hybrid buses.

Other programs have been successful and could be enhanced. The New York State Clean Cities Challenge program provides incentives to public and private fleets in New York that purchase alternatively fueled vehicles and the necessary infrastructure for refueling these vehicles. Incentives of 75 percent of the incremental cost of the vehicles and 50 percent of the cost of the infrastructure have shown to be sufficient to garner private sector involvement. The New York State Clean-Fueled Bus Program provides incentives of up to 100 percent of the incremental cost of alternatively fueled buses for school bus and transit-related fleets in the State. Technologies include hybrid-electric, natural gas, hydrogen, and propane fueled buses.

While these accomplishments are significant, there are numerous obstacles for future growth of the State's alternative fuel vehicle programs and initiatives. Vehicle manufacturers have stymied the growth of the CNG program by ceasing production of dedicated CNG vehicles. At the present time, only one manufacturer offers CNG vehicles, and produces just one model in very limited quantities. Further, there are substantial infrastructure costs to install and maintain CNG fueling stations. Emission benefits of CNG compared to other fueling scenarios must be considered as well.

The choice of E-85 vehicles is also limited, as all E-85 vehicles sold in New York must meet California Air Resources Board (CARB) emissions requirements. It is expected that some E-85 models that meet current CARB requirements may not be able to meet the 2010 CARB emissions requirements, which will further limit alternative fueled vehicle choices.

5.2.3 Upcoming Initiatives

The public sector has embraced the need to adopt the use of alternative fuels as evidenced by the statistics above but the general population has yet to follow suit. Recognizing that some corporations have instituted alternative fuel use in their fleets, only a small percentage of registered vehicles in New York may be considered alternatively fueled. Of the 8.9 million passenger cars registered in New York, about 272,000 are not gasoline or diesel powered. Of that number, almost 208,000 are flex-fuel vehicles, which are often fueled exclusively with gasoline. Widespread use by the public of alternative fuels will continue to be a challenge until a power source is available that is easy to use, convenient, safe and comparable in cost. The private sector would likely also embrace an alternative fuel technology that minimizes infrastructure development and deployment costs. Electrification of the transportation sector may offer that opportunity and benefit.

The Governor's Renewable Energy Task Force report recommended that the viability of renewable fuels be studied. Biofuels derived from cellulose or waste can be cost effective, produce significant emissions benefits, and offset some of the State's petroleum consumption. It is important that a full life cycle analysis be undertaken to determine what type of biofuels may prove to be a viable alternative to petroleum. Certain biofuels may have a negative effect on some segments of the economy and questionable environmental benefit.

Building upon existing facilities and vehicles, the public sector fleets offer an opportunity to be "test-beds" for alternative fuels and vehicle technologies. Due to the myriad operating conditions public fleets experience, alternative fuel technologies can be tested under a wide range of weather and other conditions. These fleets also provide markets for potential "niche" fuels and technologies. This could include continuation and expansion of New York's leadership role in the use of CNG vehicles (both light duty and heavy duty), as well as expanding the use of biofuels and electric vehicle technologies.

5.3 Leg 3 - Energy Efficient Transportation System Activity

Energy efficiency in the on-road sector is based on vehicle activity, in addition to vehicle technology and fuels. Improving transportation energy efficiency through vehicle activity involves reducing VMT and by reducing congestion and vehicle delays. VMT can be reduced in several ways, from an absolute reduction in travel, to increasing the occupancy of each vehicle, or to moving the same or more travelers in fewer vehicles.

The primary methods to reduce congestion and its impacts are to decrease vehicle hours of delay and total VMT. Attempts by State or local transportation agencies to mitigate congestion accomplish both of these objectives. These actions include highway construction and operational projects and policies.

Strategically selected highway construction and operating projects can enhance mobility, reduce traffic congestion, increase travel speeds and decrease energy use. Some of these mobility enhancements include:

- improvements at major 'bottleneck' locations in New York City such as Kew Gardens Interchange, Long Island Expressway/Grand Central Parkway/Van Wyck Interchange, the Bruckner-Sheridan Interchange and the rehabilitation/replacement of the Kosciuszko Bridge

- upgrading I-86 to interstate design standards to eliminate signalized intersections, provide shoulders and standardize lane widths

- maximization of investment in the Intelligent Transportation Systems (ITS). ITS encompasses a broad range of wireless and wire line communications-based information and electronic technologies. ITS programs related to incident management services, such as HELP (Highway Emergency Local Patrol) trucks, reduces non-recurring delay

- managed use lanes that encourage the use of energy efficient travel

An energy efficient transportation system is one which operates efficiently and is in a state of good repair. Transportation infrastructure must be maintained, so that it is safe, balanced and reliable. The State's transportation infrastructure investment strategies include a "fix-it-first" policy as well as other investments that support New York's energy, environmental and economic goals. Transportation infrastructure that is well maintained will optimize energy expenditures. Providing reliable, convenient and comfortable public transportation service is essential to sustaining ridership among customers with other transportation choices. Public transportation systems that are reliable and safe will not cause commuters to revert to highway travel. Roads or bridges that are well-maintained, safe and reliably open will sustain energy efficient travel speeds and avoid diversions to other routes which can increase VMT, emissions and fuel use. Maintaining the transportation system is critical to the State's transportation mission and is critical to ensure efficient movement and minimal disruptions.

The five-year highway capital program devotes 96 percent of resources to maintain and operate the system. Similar budgetary constraints apply to other components of the transportation network. This required level of financial commitment to maintenance of the system is expected to continue, if not increase, making any substantial system expansion or improvements difficult to achieve.

However, there are options available to State and local government agencies to improve the energy efficiency of the transportation systems within their control. State and municipal highway construction and maintenance practices should be updated to reflect best practices in energy efficient methods. This includes personnel management, flex hours, telecommuting, carpooling as well as advances in construction and maintenance practices, such as the use of low temperature asphalt in parking lots and highways.

The State's urban areas would benefit from technological improvements that reduce vehicle fuel use in heavy urban driving, such as hybrid-electric and hydraulic launch assist drivetrains, efficient alternators, and idle-stop systems. Working with local businesses, New York has supported the development of a number of products for urban duty commercial vehicles (taxis, delivery trucks, buses, etc.) such as the hybrid-electric city buses now in use by the MTA. An expansion of this effort aimed toward commercialization of New York-made products such as plug-in hybrid electric delivery trucks and idle-stop technology for taxis, and other products will contribute to the growth of the State's clean energy economy.

In the following sections, energy efficient options available to the State are presented by different transportation modes. It is important to note that an improvement in one transportation modality will often result in beneficial changes in other modes.

5.3.1 Highways and Bridges

New York addresses the efficiency of the transportation network through Transportation Demand Management (TDM) and Transportation System Management (TSM) measures. TDM measures alleviate traffic problems through improved management of vehicle trip demand. They are primarily directed at commuter travel and designed to reduce the use of single occupant vehicles or to alter the timing of travel

to less congested times outside the peak period. TSM measures are focused on increasing the efficiency of the transportation system through measures such as traffic signal improvements and coordination, incident management, and providing traveler information through roadside variable message signs (VMS). These programs are intended to reduce both recurring and non-recurring delay. Recurring delay occurs when traffic volumes exceed roadway capacity on a regular basis. Incident, or non-recurring delay, is caused by breakdowns, accidents, debris in the travel lanes or special events. Most non-recurring delays are random and unpredictable. Incident management strategies specifically target the congestion resulting from traffic incidents.

TSM and TDM measures have the potential to save large amounts of fuel by reducing VMT or delays. Some examples include:

- coordinating traffic signals which reduces delays at intersections and smoothes traffic flow on arterial streets
- providing express bus and vanpool/shuttle services in major transportation corridors
- developing and constructing park and ride lots
- installing TDM signs to promote carpooling opportunities
- deploying a statewide 511, a free, one-stop all-encompassing phone and web-based public access traveler information system, offering information on transportation services and conditions throughout New York and operating 24 hours a day, seven days a week
- providing employer subsidies and incentives to encourage more efficient parking, and use of carpools and public transportation

New York already heavily promotes carpools, vanpools, ridesharing, education and outreach through its support and funding for TDM service providers in the downstate area, promotion of Commuter Choice[30] programs and its air quality awareness program, Clean Air NY (www.cleanairny.org). TDM service providers supply information and other services to employers and employees about the financial, health, environmental, and other benefits of carpooling or public transportation or commuting options other than single vehicle occupant travel. These programs are effective and should be continued and enhanced. However, as indicated in Figure 17, such programs are lacking in upstate New York. A comprehensive upstate commuter and traveler assistance program and an online rideshare matching service would yield energy and environmental benefits and provide time and cost savings for participants.

[30] Commuter Choice refers to outreach, administration and management, generally by non-profit corporations, of Commuter Tax Benefits for employers and employees. Under Section 132 [f] of the Internal Revenue Code, "Commuter Tax Benefits" allow employers to save on payroll related taxes and employees to save on federal income taxes. Employers may provide workers with up to $230 per month in tax-free transit and vanpool benefits in 2009. The monthly limitation under Section 132 [f] regarding the aggregate fringe benefit exclusion amount for vanpools (commuter highway vehicles) and transit passes is $230. In addition, the monthly limitation under Section 132 [f] regarding the fringe benefit exclusion amount for qualified parking is $230. Commuters can receive both the transit and parking benefits i.e., up to $460 per month. Employers can allow employees to use pretax dollars to pay for transit passes, vanpool fares, and parking. A different benefit is available for qualified bicycle commuting.

5.3.2 Public Transportation

New York has aggressively sought to improve the customers' public transportation experience through major investment in new vehicles and facilities. In addition there has been a growing emphasis on using information technology to introduce improvements in the efficiency and reliability of service as well as to communicate more effectively with the customer regarding the options public transportation provides in meeting their travel needs.

Public transportation ITS are becoming increasingly prevalent among New York's major systems. Public transportation ITS:

- increase the efficiency and reliability of public transportation service by managing the fleet based upon real time performance information

- improve the availability of service information (such as customized itineraries that permit the customer to navigate the public transportation system from door to door or next bus arrival information at bus stops) to improve the customer's sense of confidence in relying on the service

- improve the convenience of public transportation use by providing more options and ease in fare payment

Nearly all of the major urban public transportation properties in New York have deployed or are in the process of procuring automated vehicle location (AVL) systems. These AVL systems provide dispatching and control centers with real time information on bus location and on-time performance and present opportunities for improved dynamic dispatching, timing of transfers, traffic signal priority for buses and real-time bus arrival information for customers at bus stops and on board the public transportation vehicle. The investment in this AVL infrastructure will permit ongoing improvements in the efficiency and customer friendliness of the public transportation network in New York.

Public transportation in the New York City metro area is accessible and affordable in large part due to the operating assistance that is administered and provided by DOT. In 2009, $4.3 billion in Statewide Mass Transportation Operating Assistance (STOA) will be provided to the MTA. This funding supports MTA services, including the New York City Public Transit subway and bus services and the LIRR and MetroNorth commuter rail services.

Certain essential improvements must be undertaken to improve the energy efficiency of the transportation system in New York. Viable, adequate, and "green," i.e., environmentally friendly, public transportation options must be available statewide. It is important to provide bus rapid transit in congested corridors where ridership and traffic congestion make this a promising option. Bus rapid transit provides dedicated bus service on roadways, including traffic signal pre-emption for approaching buses. Increasing public transportation ridership throughout the State will facilitate energy efficiency of the transportation system. To do so, additional public transportation infrastructure investments must be provided. A way this could be facilitated is to amend existing sections of the State Tax Law and create new sections that would allow private individuals and/or businesses to provide direct public transportation infrastructure investment in return for State income tax credits.

To improve public transportation ridership upstate, the State and upstate public transportation operators have to invest in "transit intensive corridors" in the upstate urban areas. Various improvements such as traffic signal priority for public transportation vehicles, improved bus stops and shelters, sidewalks that are ADA compliant and economic development opportunities can be bundled together to enhance the viability of public transportation in key corridors upstate.

In addition to service enhancements, technological improvements can be made to improve the energy efficiency of the existing public transportation network. Development, qualification and deployment of advanced technologies within New York's electrified rail system could reduce peak load by as much as 100 MW in the highly constrained New York City transmission and distribution (T&D) load pocket. The MTA has made substantial improvements in electrical energy utilization, but there are still many low-cost opportunities for improvements.

5.3.3 Rail and Freight

Opportunities in the commercial rail, highway, and marine sectors to promote intermodal strategies to reduce VMT and its associated emissions and petroleum use present significant opportunities to reduce New York's transportation energy use. According to the U.S. Department of Energy, intercity passenger rail service uses 21 percent less energy per passenger mile traveled than cars and 17 percent less than airline travel. Similarly, intercity passenger rail carbon emissions per passenger mile traveled are 40 percent less than cars and 56 percent less than by air travel.[31] Accordingly, the State supports technological advances in such energy efficient actions as cleaner burning locomotives, increased use of advanced information technology for improving operational efficiency, and improved aerodynamic profiles for both freight and passenger trains.

The State will seek federal funding opportunities, including ARRA, to support investment in the State's rail infrastructure. The Passenger Rail Investment and Improvement Act of 2008 and ARRA both provide capital funding for the development of passenger rail and particularly high speed rail service. The Administration has also proposed funding for high speed rail over the next five years. Railroads are three or more times more fuel efficient than trucks in terms of ton-miles moved per gallon. Every ton-mile of freight moved by rail rather than truck reduces greenhouse gas emissions by two-thirds or more.[32] However, key areas of the State are not easily reached by freight rail service. For example, Long Island receives only 1 percent of its freight shipments by rail while the national average is 15 percent for freight shipments by rail.[33]

Increasing the freight rail movement of goods by allowing modern freight cars to access the New York metropolitan area and Long Island along the east of Hudson River route can improve the competitive position of a number of industries throughout New York. The State should also remove or reduce bottlenecks in the rail system, raise bridge clearances to accommodate modern rail cars and provide for new track capacity, where needed.

In March 2009, the Governor announced the release of the 2009 New York State Rail Plan (the Rail Plan),[34] providing the first full update of the State's rail strategy in 22 years. The Rail Plan spells out a comprehensive strategy for supporting freight and intercity passenger rail service. The Rail Plan presents an inventory of freight and passenger rail system infrastructure needs in New York totaling more than $10.7 billion during the next 20 years. In establishing goals for the future, the Rail Plan makes clear the critical importance of a strong federal partnership in support of modern, efficient rail service. Since much of the rail system in New York is privately owned, the Rail Plan also highlights the need for partnering

[31] DOT. *New York State Rail Plan*. 2009. https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan

[32] DOT. *New York State Rail Plan*. 2009. https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan

[33] DOT. Draft Environmental Impact Statement (EIS), Long Island Truck Rail Intermodal Facility. 2007

[34] DOT. *New York State Rail Plan*. 2009. https://www.nysdot.gov/divisions/policy-and-strategy/planning-bureau/state-rail-plan

with private railroads and other stakeholders to make infrastructure improvements that will make rail travel more attractive to consumers and the business community.

5.3.4 Aviation

The aviation system is suffering from growing congestion and delays at airports. Delays and congestion waste fuel and cause excess emissions. These delays also affect the State's and nation's economies and quality of life. The State should work with and encourage the federal government to continue timely investment in the aviation system. Improved efficiencies of air traffic movement could be realized by greater use of the Next Generation Air Transportation System (NextGen). NextGen is the name given to the project to completely overhaul the U.S. national air space system (NAS) by moving from radar based air traffic control to more of a global positioning system satellite based system. The Federal Aviation Administration plans to modernize the NAS through 2025. Through NextGen, the impact of air traffic growth is addressed by increasing NAS capacity and efficiency while improving safety, environmental effects and user access to the NAS.

5.3.5 VMT Reduction Working Group

The Governor's Renewable Energy Task Force established an Interagency Vehicle Miles Traveled Work Group. This Work Group is considering ways to increase vehicle efficiency and reduce VMT. For vehicle efficiency, the Work Group is looking at tire efficiency standards, a revenue neutral fee-based system and support of advanced technologies. The Work Group is also charged with developing a plan to reduce VMT statewide by 10 percent from projected levels within 10 years.

Reducing VMT is an important goal and will assist the State's overarching effort to reduce petroleum use in the transportation sector and respond to global climate change. Achieving a 10 percent reduction in projected VMT is an aggressive and challenging task and will require a full complement of strategies including: efficient land use patterns; transit oriented development; walkable communities; reinvestment in existing urban centers; enhanced public transportation and intercity rail and bus service; pedestrian and cycling infrastructure; alternatives to, and public education of, alternatives to single occupancy vehicles; and pricing policies.

While the work of the Work Group is ongoing, it has developed some initial recommendations that will help frame and guide its upcoming efforts. They are:

- statewide VMT levels, data limitations, discrepancies and trends should be reported as part of the anticipated annual report on progress to implement recommendations of the State Energy Plan
- the State should support local government pricing policies that will reduce congestion and VMT
- the State should develop additional funding streams to fund VMT reduction strategies. Funding options include federal cap and trade climate legislation as well as regional efforts such as the Regional Greenhouse Gas Initiative, among others
- the State should continue to advocate for a change to federal transportation allocation formulae to reward efficient transportation systems

- since the 2002 State Energy Plan, Transportation Plans and Transportation Improvement Programs (TIPs) have been reporting GHG emissions, energy consumption and other emissions. Transportation Plans and TIPs should embrace smart growth and GHG emission reductions as key principles and continue to estimate greenhouse gas emissions, energy use and other emissions as part of their adoption and reporting requirements

- all State agencies should consider transportation choices, energy use, energy conservation, and climate change as part of their State Environmental Quality Review Act reviews when they are lead agencies

- transportation funding in local communities should be prioritized for those communities with updated, written comprehensive plans that contain smart growth and VMT reduction principles

Other VMT reduction strategies recommended elsewhere in this Brief are supported by the Interagency VMT Work Group, such as TDM and TSM measures, promotion of commuter choice programs, recommendations related to enhancements of the public transportation system statewide, and measures to shift freight to rail or otherwise improve NY's rail system.

5.3.6 Smart Growth Initiatives

Land use planning is an important factor in determining the future of the transportation system and it's operational and maintenance needs. Smart Growth is sensible, planned, efficient growth that integrates economic development and job creation with community quality-of-life by preserving and enhancing the built and natural environments. Smart Growth encourages growth in developed areas to sustain existing infrastructure, particularly municipal centers, downtowns ("Main Streets"), urban cores, hamlets, historic districts and older first-tier suburbs. The Governor's Smart Growth Cabinet has been examining this topic and is developing methods for applying Smart Growth[35] principles in New York.

Smart Growth policies draw a connection among land use patterns, transportation decisions and energy use. Development patterns have led to sprawl and its associated VMT growth in metropolitan areas. Sprawl is characterized by widely-dispersed, low density development patterns and isolated, separate land uses, accessible almost exclusively by car. Single-use, low-density zoning provided the legal and regulatory framework for dispersed, isolated and disconnected development in the suburbs.

Transit Oriented Development (TOD) has become an increasingly common form of land use. Mixed use, higher density development clustered around convenient public transportation and pedestrian friendly infrastructure has begun to claim a larger share of the real-estate development market in metropolitan areas around the country.

Public transportation use and by extension, energy implications of this denser form of development have been significant. The recently published Public Transit Cooperative Research Program Report 128 evaluated the actual performance of 17 existing TOD projects around the United States. Analysis of these existing developments suggests that "TOD households are twice as likely to not own a car, and own roughly half as many cars as the average household. At an individual station, TOD can increase ridership by 20 percent to 40 percent, and up to 5 percent overall at the regional level. Residents living near public transportation are 5 to 6 times more likely to commute by public transportation than other residents in their region." Research by APTA and others has further defined a "public transportation multiplier"

[35] Information about Smart Growth may be found at Smart Growth Network. *Smart Growth Online*. 2009. http://www.smartgrowth.org

effect where every public transportation passenger mile actually translates to 5 to 7 miles of auto travel avoided. If this increased rate of public transportation trips is viewed as auto trips avoided as a result of TOD, there is significant potential for this form of development to reduce VMT, fuel consumption and pollution emissions.

6 Transportation Funding

The State's ability to meet its diverse transportation obligations, and transportation energy efficiency goals, and to transition away from reliance on petroleum, will be highly dependent on available financial resources.

Existing transportation funding is insufficient to meet New York's existing transportation needs. For example, in its 2009-2014 Multimodal Transportation Program Submission, DOT identified a five-year capital program need of $25.7 billion for the upstate public transportation system. Known federal, State and other available funding amounts to $20.8 billion, leaving a gap of $4.9 billion. When system needs are projected out 20 years, the capital requirements increase to $175.2 billion. Adding in the operating and capital investment needs for the State transportation system, the total costs to preserve and operate New York's multimodal transportation system are conservatively estimated to exceed half a trillion dollars over 20 years. It is imperative that New York pursue improvements to federal and State funding in order for New York to meets its inter-related transportation, climate change and energy goals. Transportation pricing should promote, not discourage, energy efficient travel.

The inadequacy of transportation funding has been well documented. For instance, in December 2008, the Commission on Metropolitan Transportation Authority Financing (also known as the Ravitch Commission) released a number of recommendations related to the MTA's operating and capital needs. Among other recommendations, it proposed a regional mobility tax, tolling of the currently non-tolled East River and Harlem River Bridges, support for Bus Rapid Transit, and regular toll and fare increases. In May 2009, the New York State Legislature approved a $2.26 billion transportation funding plan for the MTA which includes a new regional payroll/mobility tax to provide funding for operations.

6.1 New York State's Federal Agenda for Transportation

Energy efficiency in the transportation sector can be enhanced by actions at the federal level through legislation, regulation and policy. Federal issues fall into two basic areas: legislation related to climate change and surface transportation re-authorization. Both aspects can substantially affect New York's status as the most transportation energy efficient state by providing for transportation programs and policies that enhance energy efficiency and reduce emissions.

6.1.1 Federal Climate Change Legislation

Transportation accounts for nearly a third of greenhouse gas emissions in the nation and about 39 percent in New York. Federal climate change legislation can be expected to be enacted in the near future setting cap and trade requirements for the utility sector and providing for the sale of CO_2 emission allowances. This legislation should be crafted to provide additional funding to reduce greenhouse gas emissions from the transportation sector. Public transportation and intercity passenger rail may be particularly effective for reducing emissions from the transportation sector. A portion of the funds raised as part of allowance auctions should be allocated to transportations projects that reduce GHG. Eligible projects should include: new or enhanced public transportation service, including conversion of existing fleets to hybrid

or other technology that reduces greenhouse gas emissions; new, expanded or improved inter-city rail or bus service, including conversion of existing vehicles to hybrid or other technology that reduces greenhouse gas emissions; and other transportation projects that cost-effectively reduce greenhouse gas emissions and do not add any highway capacity to the existing roadway system.

6.1.2 Re-authorization of SAFETEA-LU

The Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) provides funding for highways and public transportation. SAFETEA-LU expired on September 30, 2009. Work continues on the successor to SAFETEA-LU. Because this legislation will establish funding and priorities for surface transportation in the nation, the reauthorized SAFETEA-LU is an opportunity to help New Yorkers conserve energy, improve safety and reduce pollution while enhancing the mobility of goods and people.

Increase Federal Funding for Energy Efficient Modes

Freight traffic is expected to double in the next 20 years. The highway system cannot absorb this traffic growth. Although SAFETEA-LU is primarily aimed at providing federal funding for the highway and public transportation systems, some elements of SAFETEA-LU can be used for improving rail service. The Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) provides loan guarantees and credit enhancements for major transportation projects, including rail. While TIFIA could be a powerful tool for promoting investment in energy efficient rail projects, the project threshold size of $100 million limits the usefulness of the program. SAFETEA-LU also continued the Railroad Rehabilitation and Improvement Financing (RRIF) program, which provides credit enhancements to fund investments in regional and shortline railroads. Providing federal funds to underwrite the risk premium on loans to shortline and regional railroads will help ensure that rural New York will continue to have access to energy efficient rail freight transportation. Congress should create an intercity passenger rail account separate from the highway and mass public transportation accounts that is funded from a diversified portfolio of new revenue (described below).

Change Federal Funding Allocation Formulae

Many federal transportation allocation formulae under SAFETEA-LU reward actions that run counter to the notion of an energy efficient transportation system. For example, the Equity Bonus program, designed to minimize donor-donee[36] differences among states rewards states for increased fuel consumption. Under the Equity Bonus program, the more gas consumed, the greater a state's share of Equity Bonus funding. Equity Bonus has become the largest single category of funding in the federal highway program. Equity Bonus does not focus on performance, needs or energy efficiency. Perhaps most fundamentally, transportation funding formulae should incentivize states and governmental entities to reduce energy usage and acknowledge states that are already fuel efficient. A portion of transportation funding could be based on parameters such as transportation fuel used per capita with greater resources allocated to states with lower fuel usage per capita. As the technology is developed, road pricing concepts that are consistent with climate change goals will likely be the best strategies to address infrastructure needs. These may include interstate tolling, a VMT tax, pay as you drive insurance, or some combination.

[36] Donor states are those states that provide more revenue to the federal government than they receive in federal assistance. Donee states receive more federal assistance than revenue they provide to the federal government. New York is a donor state.

6.1.3 Preserve and Maintain Essential Infrastructure

With passage of the Federal-Aid Highway Act of 1956, the federal government embarked on the largest single public works project in the nation's history, the construction of the Interstate highway system. Much of the national system of highways and bridges is now approaching 50 years old. Many of these highways and bridges, including those in New York, are nearing the end of their useful lives and require major reconstruction or replacement to remain safe and usable into the future. These older Interstate segments, many in metropolitan areas, are especially in need of repair and replacement. New York supports a federal financial commitment and strategy for rehabilitating, maintaining, operating, and, when necessary, replacing the existing transportation infrastructure before investing in system expansion.

6.1.4 Increase Federal Funding For Public Transportation

New York's public transportation systems provide one-third of all public transportation trips nationally. As a result of this heavy public transportation use, New York has the lowest-per-capita gasoline consumption of any state in the nation. Public transportation ridership is growing at record rates nationwide, but especially in New York. The core capacity of New York's public transportation system is no longer adequate to address this new demand for service. In addition, the modernization needs of the State's systems also need to be addressed if public transportation is to continue as a major element in the State's energy independence and climate change mitigation strategies. New York is not alone in these circumstances. A recent Federal Transit Administration (FTA) Rail Modernization Study found that more than one-third of the nation's public transportation rail assets are either in marginal or poor condition, indicating that these assets are near or have already exceeded their expected useful life. The study went on to conclude that public transportation transit industry as a whole would benefit from the development of a temporary funding program designed to eliminate the existing state of good repair backlog. FTA has reached similar findings for the nation's bus systems as part of its on-going State of Good Repair Roundtables.

Increased federal public transportation funding is not only essential to maintain and improve the physical condition of the existing system and to improve service performance, but it is required if public transportation is expected to continue to play a strong role in renewed national efforts to align energy, environment, economic development and transportation policies.

As part of re-authorization efforts, New York supports the establishment of national public transportation policies to enable a doubling of ridership nationally to more than 20 billion by 2030 and 50 billion by 2050. The next surface transportation bill should authorize sufficient guaranteed investment levels in the federal public transportation program over the six-year authorization period to modernize New York's public transportation systems and address core capacity issues necessary to achieve national ridership goals.

6.1.5 Congestion Mitigation and Air Quality

The Congestion Mitigation and Air Quality (CMAQ) program provides funds to implement transportation projects that reduce air pollution in air quality non-attainment areas. Many of these projects not only reduce air pollution, but also reduce fuel consumption and/or reduce greenhouse gas emissions. For instance, CMAQ funds have been used to fund rail freight projects and an electric station car pilot project in the New York City metropolitan area, as well as other public transportation projects in communities across the State. CMAQ has a vital role in New York's air quality improvement strategy. The next surface transportation bill should retain the CMAQ program. It should also build upon the success of the

program and establish a complementary program, similar to the CMAQ program, for transportation projects and programs that reduce greenhouse gases.

6.1.6 Increase Federal Funding for System Efficiency

Information technology is an important tool for improving the energy efficiency of the transportation system. ITS technologies provide traveler information, help manage traffic incidents, manage traffic flow, provide information on carbon footprints, improve the movement of freight, ease the connections between modes, and provide data on the system's condition and performance. Enhanced federal funding for ITS will help make the transportation system operate more efficiently and save energy. The next surface transportation bill should provide enhanced funding for ITS and transportation system operations.

6.1.7 Dedicated Federal Funding for Rail

The Federal Railroad Safety Improvement Act was signed into law on October 16, 2008. The bill authorizes $16.7 billion for investments in intercity passenger rail across the country over the period FFY 09-13. Unlike highways, transit and aviation, there is no dedicated federal funding for rail. Congress must pass annual appropriations to provide funding from the General Fund for the new rail authorizations. Congress should create an intercity passenger rail account separate from the highway and mass transit accounts of the Highway Trust Fund that is funded from a dedicated diversified portfolio of new revenue.

6.2 New York State Funding for Transportation

The need for transportation resources is enormous and current revenue sources are not sufficient to meet New York's needs. The State, led by DOT, will be undertaking an evaluation of modified or new State funding mechanism(s). The resources from this funding mechanism(s) would be available to maintain the transportation system in a state of good repair as well as to realize energy efficiency improvements in the transportation sector and provide for research to enhance the sector's energy efficiency.

The funding mechanisms could take the form of one or more of the following: increase the existing state gas tax; pay-as-you-drive insurance; a new VMT tax; a feebate upon the sale and registration of new and used vehicles; a carbon emissions tax; or congestion pricing (in urban areas). New York should determine which form (or forms) of transportation pricing the State should pursue, seeking to optimize funding, greenhouse gas reduction and energy efficiency improvement and move to implement through legislation and/or regulation within the time frame of this State Energy Plan. The form(s) of transportation pricing may change as technology improves and facilitates the implementation of road pricing concepts. In evaluating which form(s) of road pricing might be implemented, the State should consider these factors: the potential revenue generation, not only the potential amount but the stability of the fund source; ease of implementation and administration; equity, both geographic and social; impact on the performance of the transportation system; and public acceptance.