SECTION 2.4

ENERGY AND TRANSPORTATION

INTRODUCTION

This issue report examines the relationship between meeting New York's transportation needs and the complementary goals of fostering economic growth, preserving and enhancing the environment for an improved quality of life, and increasing energy efficiency. The success in meeting transportation needs is an important determinant in successfully achieving these other important goals. The 1998 State Energy Plan laid the foundation for many of the State's transportation policies with regard to energy-efficient travel. The themes, policies and objectives, identified in the 1998 State Energy Plan remain valid today. Many of the strategies and implementation steps discussed in that Plan are continuing. In addition to the importance of establishing energy related goals and objectives for the State, the State Energy Plan is valuable because it also facilitates the integration and coordination of important policy decisions by the State. The State Energy Plan is coordinated with the statewide Master Transportation Plan prepared by the State Department of Transportation and the State Implementation Plan for air quality prepared by the State Department of Environmental Conservation.

This issue report stresses several broad themes, in the context of energy-efficient transportation, including:

- Trends in transportation and travel;
- How State, regional, and local transportation providers can effectively enhance and encourage efficient transportation;
- Innovation in transportation technology for improving energy efficiency in the transportation sector;
- Activities and programs that enhance the use of alternative fuels and alternative fuel technology and infrastructure to reduce the transportation sector's overwhelming dependence on conventional fuels; and,
- Role of energy-efficient transportation measures for meeting federal and State air quality goals.

TRANSPORTATION PATTERNS AND TRENDS - AN OVERVIEW

Highways

Highway travel [in daily vehicle miles traveled (DVMT)] on New York roadways from 1990 to 2023 is presented in Figure 1. Travel on New York roadways is currently about 352 million vehicle miles per day. This traffic volume results in an annual total of 128.7 billion vehicle miles traveled (VMT). Vehicle travel in New York has grown by approximately 2.5% to 3% or more per year since 1950. During the 1990s, however, growth in vehicle miles traveled has slowed to about 2% per year. While DVMT is expected to grow throughout the 20-year forecast period, the rate of growth is expected to decline slightly with a 10-year growth rate of about 1.4% annually from 2000 to 2010, and 1% annually from 2010 to 2020. Nonetheless, if current trends continue, DVMT on New York roadways are forecasted to increase by 30% in the next 20 years.

FIGURE 1
New York State Existing & Forecasted Daily Vehicle Miles Traveled (DVMT)

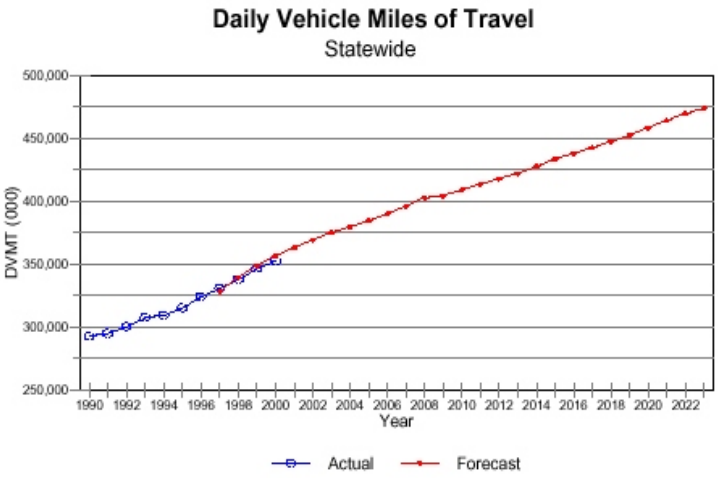
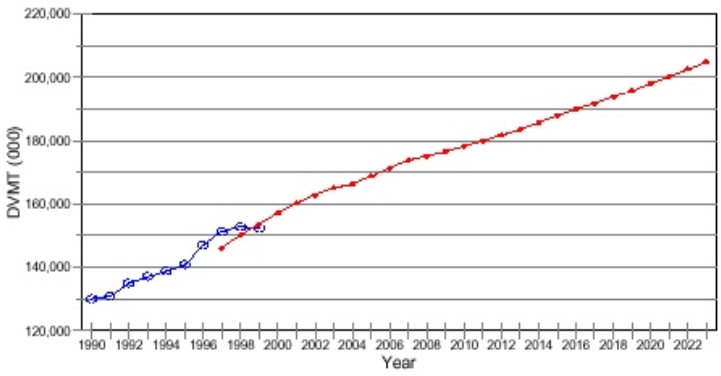


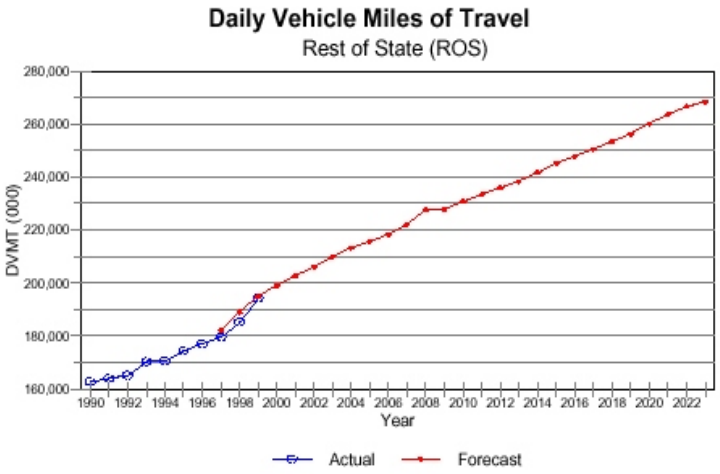
FIGURE 2
New York Metro Region Existing & Forecasted Daily Vehicle Miles Traveled (DVMT)



The existing and forecasted vehicle travel trends for the downstate New York metropolitan region are shown in Figure 2. Vehicle travel

trends in upstate New York are shown in Figure 3. The forecasted increase in vehicle travel in the New York City metropolitan region is slightly lower than the remainder of the State. The higher use of public transit in the New York City metropolitan region slows downstate DVMT growth compared with upstate New York, where development patterns continue to result in increasing vehicle travel, as household discretionary travel and work trip distances both increase, and related truck delivery trips also rise.

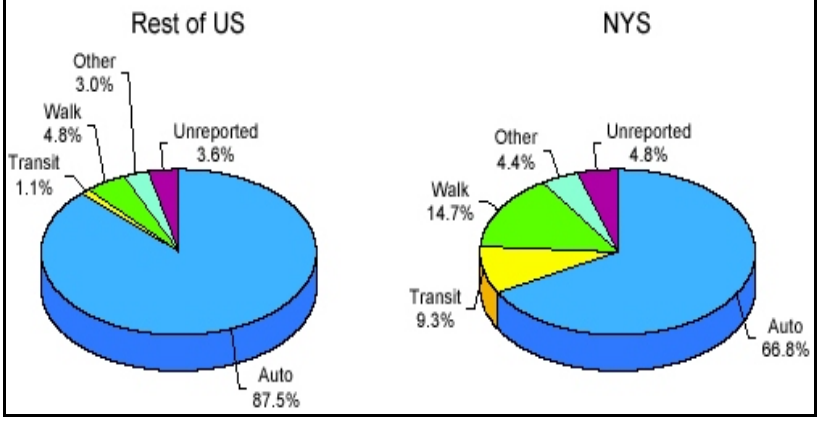
FIGURE 3
ROS Existing & Forecasted Daily Vehicle Miles Traveled (DVMT)



Transit

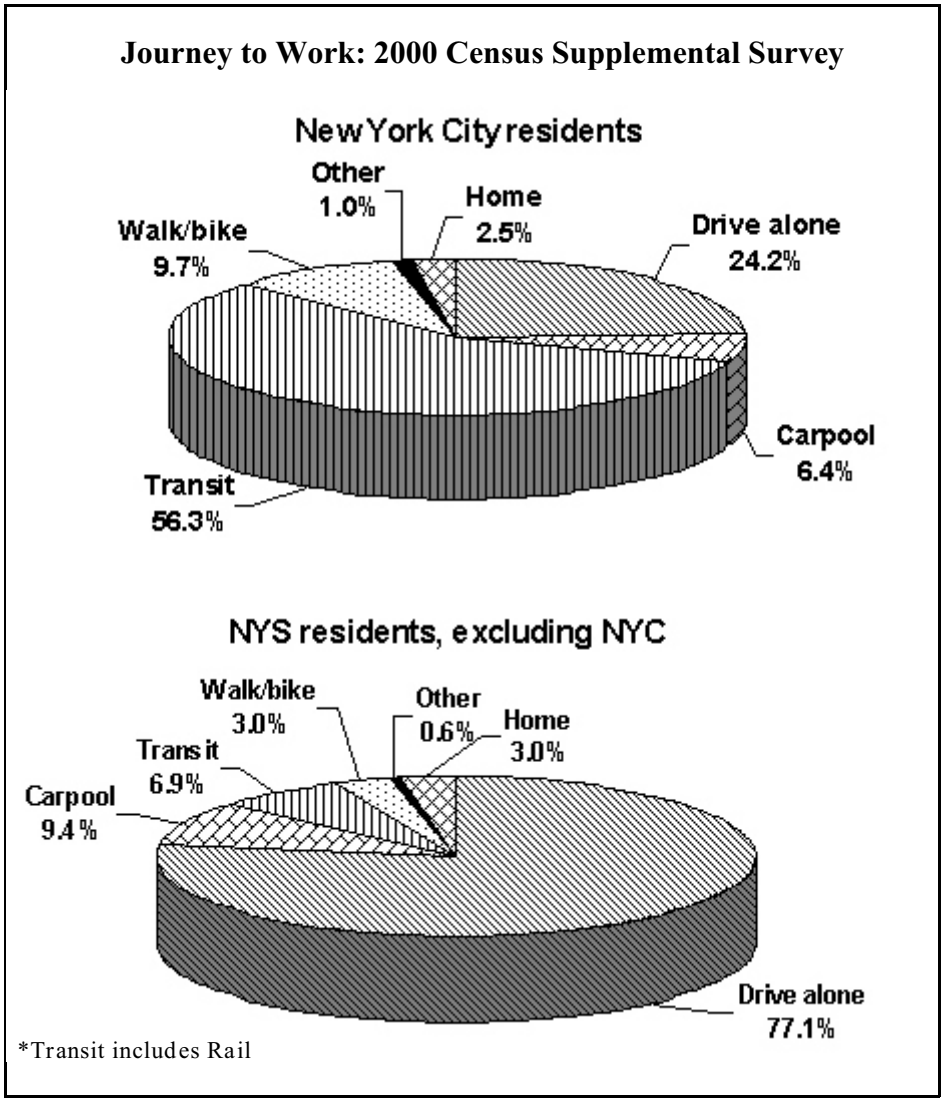
New York has the most energy-efficient transportation sector in the nation, owing to the high per-capita use of transit alternatives including buses, subways, commuter rail, and ferries. More than one-third of all national transit passengers are in New York. The percentage of all daily person trips by travel mode for all travel purposes reported in the 1995 National Personal Transportation Survey (NPTS) is shown in Figure 4, with New York having a much larger percentage of transit trips than the rest of the U.S. (9% vs. 1%). Examining journey-to-work trips, Figures 5 and 6 clearly delineate the impact of 56% transit use for

Figure 4
Daily Person Trips
1995 Nationwide Personal Transportation Survey



the New York City metropolitan area compared to the overall State travel picture and the rest of the nation, respectively. New York leads the nation with the lowest fuel use per capita of any state. Also contributing to low per-capita fuel use is the number of New York residents working at home. This figure has increased from 2.6% of all workers in 1990 to 5.1% in 1995, as reported by the 1995 NPTS.

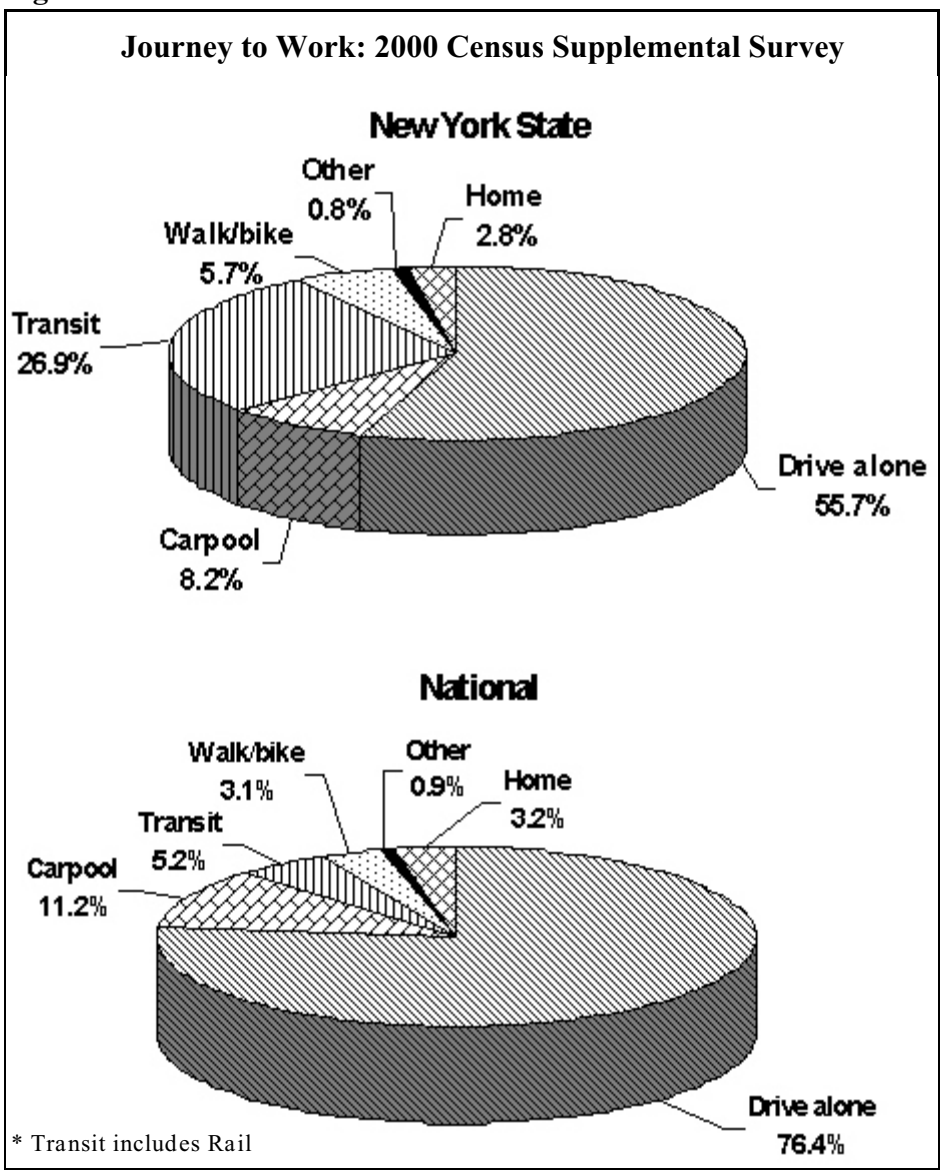
Figure 5



The statewide Master Transportation Plan emphasizes maintaining transit infrastructure and providing operating improvements that will continue to improve the energy efficiency of travel in New York. The significant continuing investment in Intelligent Transportation Systems (ITS) statewide is also expected to have a positive

effect on future energy use. Were it not for New York's investment in public transit service, resulting in a more energy-efficient transportation system, the diversion of those riders to single-occupant vehicles would increase annual vehicle miles traveled by 25 billion miles.

Figure 6



Freight

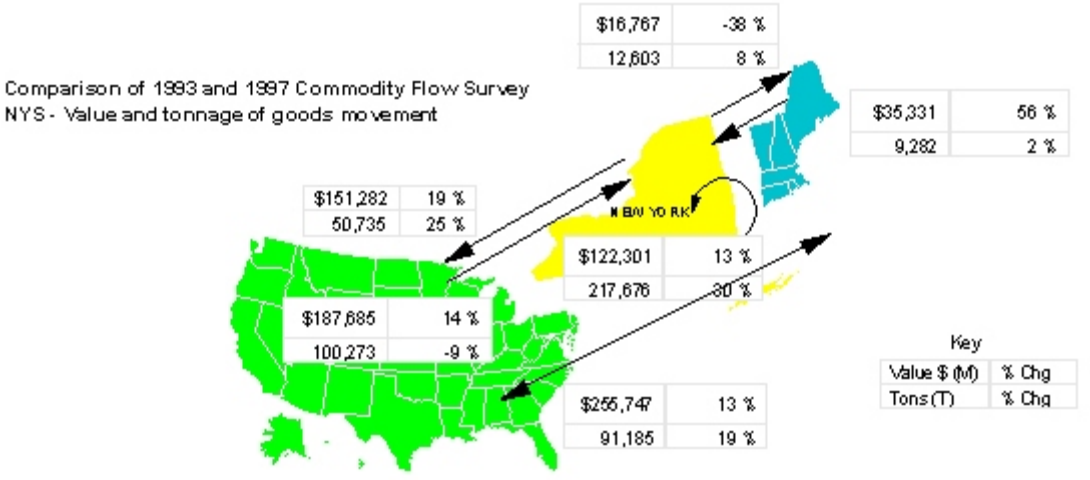
There is evidence of the recent growing importance of freight truck traffic on New York's roadways. Truck traffic showed increases of 20% to 37% on six of the eight bridge crossings between New York and Canada from 1996 to 2000. Clearly, the North Atlantic Free Trade Agreement (NAFTA) has had an impact on truck travel in the State, as the number of trucks traveling through New York to and from Canada, as well as to and from destinations in New York, have led to this increase. In the New York City metropolitan area, while auto traffic dominates in terms of the overall number of vehicles, on a percent basis, the increases in truck traffic on bridge crossings were also substantially higher than increases in auto traffic. This represents significant future challenges for infrastructure repair, congestion, economic development, and air quality goals.

Trends in freight travel are presented in Figure 7, which compares the value and tonnage of goods movement between New York and destinations in the rest of the U.S. in 1993 and 1997, with the New England states also included as a subcategory of trade. Based on the Census Bureau's 1997 Economic Census' Commodity Flow Survey, the value of goods shipped to New York is increasing while the total tonnage of these goods is decreasing. This underlines the fact that heavy raw materials, which tend to have higher tonnage and lower value, relative to higher-value goods (*e.g.*, computer software and electronic retail goods) are a declining percentage of freight travel to New York, while the lighter, high-value freight shipments are increasing. Note also the summary table of total commodity flow in Figure 7 indicates that New York is a net importer of freight shipments, as both the value and tonnage originating outside New York is greater than the amount New York ships to the rest of the nation.

Trucking is the predominant mode of freight transportation in New York. Rail carries a substantial amount also; in 1997 over 7 million tons of freight were exported from New York. Waterborne freight exports accounted for nearly 20 million tons. These freight travel trends have implications for future energy use. The increase in the professional service sector has also spawned an increase in overnight deliveries of letter packages because smaller trucks (*e.g.,* Federal Express, United Parcel Service) comprise a higher portion of goods movement in New York than previous years. The New York City metropolitan region, a large market with excess disposable income resulting in deliveries of high-end value goods, disproportionately contributes to increases in truck traffic. Traditional heavy-duty, long-haul trips still make up a significant portion of the travel and resulting congestion in New York, but are not growing as fast as the short-trip

deliveries of high-value goods for New York's retail and business markets and consumers.

Figure 7



Shipment Direction	Value $ (000,000) 1993	Share	Value $ (000,000) 1997	Share	% Chg	Tons (000) 1993	Share	Tons (000) 1997	Share	% Chg
Originating In NYS										
To Other States	154,081	23 %	168,049	22 %	9 %	52,369	13 %	63,338	13 %	21 %
To Within NYS	107,813	16 %	122,301	16 %	13 %	167,403	42 %	217,676	45 %	30 %
Total	261,894	39 %	290,350	38 %	11 %	219,772	55 %	281,014	58 %	28 %
Originating Outside NYS										
To NYS	187,014	28 %	223,016	29 %	19 %	119,080	30 %	109,555	23 %	-8 %
Total NYS	448,908	67 %	513,366	67 %	14 %	338,852	84 %	390,569	81 %	15 %
Through NYS	226,039	33 %	255,747	33 %	13 %	63,799	16 %	91,185	19 %	19 %
Net NYS	674,947	100 %	769,113	100 %	14 %	402,651	100 %	481,754	100 %	20 %

Source: 1997 Economic Census, Commodity Flow Survey

Personal Travel Trends

The NPTS household travel trends provides a breakdown of personal travel throughout the State by trip purpose, travel mode, and vehicle type. The NPTS trends provide an estimate of how changing travel patterns impact energy use, taking into account estimates of fuel use by vehicle type. The United States Department of Transportation's (U.S. DOT) Federal Highway Administration also provides national reports on the entire NPTS that are valuable for judging regional and interstate travel trends, which are growing in importance for examining future transportation energy impacts.

The personal travel trends identified by New York's portion of the NPTS follows the national trends in several key categories that impact energy use. The 1995 results showed that the number of persons per household continues to decline, while the number of vehicles and workers per household continues to increase and the average trip length continues to grow. These trends combine to increase DVMT even with a stable population base. In addition, the 1995 NPTS showed that the number of trips per household and the miles traveled to work both continued to increase compared with previous survey years. Another NPTS is currently underway, so that it will be possible to see if these trends are continuing. For now they lead to the conclusion that the personal travel portion of New York's DVMT will likely continue its upward trend, with the resulting total statewide DVMT also impacted by the general business cycle for the remaining portion of business travel.

The policies and objectives set forth in this Energy Plan provide many areas where efforts to improve the efficiency of the transportation system are aligning with these new travel trends, such as the statewide ITS program, passenger rail and bus infrastructure upgrades, transit (including ferry service) enhancements, promotion of new pedestrian and bicycle facilities, intermodal freight access improvements, and the New York High Speed Rail Initiative.

ENHANCING AND ENCOURAGING ENERGY-EFFICIENT TRANSPORTATION

Energy use in the transportation sector is derived from the amount of travel, expressed as VMT, and fuel economy, expressed as miles per gallon (MPG). Increasing energy efficiency in the transportation sector can be accomplished by reducing VMT, increasing the fuel economy of the vehicles used for travel, or by reducing congestion and vehicle delays. Reducing VMT can be achieved in a number of ways, from an absolute reduction in travel to increasing the occupancy of each vehicle to move the same or more travelers in fewer vehicles (shifting from single-occupant vehicles [SOVs] to high-occupancy vehicles [HOVs], which include carpools, vanpools, and transit vehicles).

As travel has increased, the level of congestion, often expressed as vehicle hours of delay (VHD), on many roads has also increased. A major impact of congested travel is an increase in the amount of fuel used to make a trip. For 2000, it is estimated that travel delays on the State highway system resulted in almost 285 million gallons of wasted fuel. If nothing is done to address congestion, the amount of wasted fuel would rise to over 400 million gallons by 2006, an increase of 40%. Across the State, many actions have been

taken to reduce the worsening congestion on New York's highways, but it remains a major challenge, especially in urban areas. New York is proposing and implementing a number of congestion mitigation measures as part of its capital and operating programs. Estimates from the most recent capital program update in 2000 for the 5-year period from State fiscal year (SFY) 2001/2002 through SFY 2005/2006, indicate that these congestion mitigation measures would reduce the growth of VHD by almost 120,000 hours per day, resulting in estimated fuel savings of 45 million gallons annually, a savings of over 10% compared to the fuel wasted under the "no build" projection. As congestion decreases, air pollutant emissions and energy use also decline. The following section describes some of the actions undertaken by New York that enhance mobility within the State through congestion mitigation and have a positive impact on energy use and efficiency in the transportation sector.

Reducing Person Hours of Delay And Vehicle Miles Traveled

The cost of congestion to New York residents is exceedingly high, including unnecessary extra vehicle wear and tear, lost time, increased fuel use, and increased delivery costs. Using current information on traffic flows and roadway facilities, the New York State Department of Transportation (DOT) estimates that congestion on State-owned highways alone cost New Yorkers almost $5 billion in 2000. Assuming nothing is done to ease congestion, and assuming typical traffic growth rates and current fuel prices, this figure grows to just under $7 billion in 2006, a 40% increase. These figures do not include travel and delays on roads owned by local governments, which generally have lower traffic volumes.

The primary methods used to reduce congestion and its impacts are decreasing VHD and total VMT. Every action undertaken by the State or local transportation agencies to mitigate the growth of congestion attempts to accomplish one or both of these objectives. These actions by nature are multi-modal, covering highway construction and operating projects, transit capital projects and operating policies (*e.g.,* fare incentives), and motor carrier and rail freight services. As an example of the scope and range of activities, the following international border crossing projects and initiatives have been implemented or are being implemented at New York's international border crossings to help reduce congestion and reduce energy use:

- Deploying two Intelligent Transportation Systems and Commercial Vehicle Operations (ITS/CVO) units at the Peace Bridge, which are expected to improve the efficiency and flow of traffic and trade across the border by reducing the time

for processing commercial vehicles and reducing the number of required secondary inspections.

- Developing a strategic plan with the Niagara Falls Bridge Commission (NFBC) to address the traffic queuing and safety concerns within the plaza and along the approaches to the Lewiston/Queenston bridge, including installing cameras within the plaza, and variable message signing and pavement sensors on the approaches and connecting highway that will be tied to a transportation management center.

- Modernizing the Interstate Route 87/Champlain Inspection Plaza to increase its capacity and reduce traffic queues.

Carefully selected highway construction and operating projects can enhance mobility, reduce traffic congestion, increase travel speeds, and decrease energy use. Highway and bridge construction projects can improve traffic conditions and travel speeds that lead to energy savings.

Examples of highway capital projects that decrease energy use through mobility improvements include the following:

- Rebuilding State Route 17 into a four-lane, controlled-access facility for designation as Interstate Route 86. This will result in increased safety and economic development along the Southern Tier and in Western New York, and will reduce delays along this corridor.

- Expanding the HOV lane network along the Long Island Expressway in Nassau and Suffolk counties.

- Reconstructing the Interstate Route 684, State Route 120, and State Route 22 interchange in Westchester County.

- Widening State Route 22 from Interstate Route 84 to County Road 65 in Putnam County.

In addition to capital improvements to the highway system, New York addresses the operating efficiency of the network through the use of Transportation Demand Management (TDM) actions and Transportation System Management (TSM) measures. TDM actions alleviate traffic problems through improved management of vehicle trip demand. These actions are primarily directed at commuter travel and are structured to reduce the dependence on and use of SOVs, or to alter the timing of travel to other, less-

congested times outside the peak periods.[1] TSM measures are focused on increasing the efficiency of the transportation system through measures such as ITS techniques, traffic signal improvements and coordination, incident management, and providing traveler information through Variable Message Signs (VMS). It is important to recognize that there are two kinds of delay that must be addressed. Recurring delays occur when traffic volumes exceed the roadway capacity and tend to happen on a regular basis. Actions to reduce recurring delay include most of the TDM strategies and TSM actions such as signal coordination and ITS. Incident, or non-recurring, delay is caused by incidents on the roadway that reduce traffic flow. Incidents include accidents, vehicle breakdowns, debris in the travel lanes, or special events. Most incident delays are random, unpredictable events. Incident management strategies specifically target the congestion resulting from traffic incidents.

All TDM and TSM measures have the potential to save substantial amounts of fuel by reducing VMT or reducing delay. A wide variety of TDM and TSM actions are targeted at reducing the growth of congestion in the State. Some examples of these TSM and TDM actions include the following:

- Implement a Highway Emergency Local Patrol (HELP) program to decrease highway delay caused by incidents, such as accidents and breakdowns. HELP trucks are currently operating in several areas across the State, including New York City, Long Island, the Lower Hudson valley, and the Capital District. This program has recently been expanded to include Scajaquada and Kensington Expressways in Buffalo.

- Coordinate traffic signals, which reduces delay at intersections and smooths traffic flow on arterial streets.

- Develop and expand express bus and vanpool/shuttle services in the Cross Westchester Expressway and Long Island Expressway transportation corridors.

- Develop and expand park-and-ride lots, primarily in the lower Hudson Valley and Long Island.

- Install TDM signs to promote carpooling opportunities on the Staten Island Expressway.

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[1] TDM focus areas included: the monitoring, program funding, and evaluation of voluntary TDM programs; TDM incentive and grant programs to facilitate participation in alternative commute modes; TDM integration with other mobility and capital programming initiatives; TDM modeling and evaluation mechanisms; commuter choice/employer issues; employer based technical assistance services; and development of TDM partnerships.

- Provide grants to assist private employers on Long Island and in the lower Hudson Valley to develop alternative commuter transportation services at work sites.

ENCOURAGING ENERGY-EFFICIENT ACTIONS BY TRANSPORTATION PROVIDERS

Governments at all levels provide transportation infrastructure by constructing, maintaining, and operating roads, bridges, and other facilities. This infrastructure is used by travelers and public and private transportation providers such as public transit authorities, intercity bus companies, and the trucking industry. Government agencies need to work with these public and private transportation providers to encourage them to adopt programs and policies that meet traveler needs and contribute to improving energy efficiency. Government agencies can encourage energy-efficient actions by transportation providers through pricing structures, taxing methods, subsidies, and regulations. In addition, government transportation providers must carefully apportion transportation resources between existing facilities and the need to expand the network to satisfy unmet demand. Using the majority of scarce resources to keep transportation facilities in a state of good repair continues to be an essential element of good energy policy. Inadequate infrastructure investment increases direct and indirect costs to businesses and consumers. A deteriorated highway and bridge network increases direct economic and energy-related costs, including unnecessary fuel consumption, motor vehicle depreciation, labor costs, and accidents.

In 1995, the Governor developed a five-year capital program to address the infrastructure needs of the State's highways and bridges. The goal of the program was to stabilize the condition of the State's roads, improve the condition of the State's bridges, and facilitate economic expansion through the implementation of capital and preventive maintenance work. During the five-year period between SFY 1996/97 and SFY 2000/01, DOT received bids on nearly $6 billion worth of construction. Fully 88% of those projects, at a cost of over $5 billion, were infrastructure projects and it is expected that over the next five years this percentage will stay about the same. In addition, capital projects include energy-saving improvements such as new or improved traffic signals and other intersection improvements. These activities improve traffic flow, reduce travel time, and increase mobility. DOT employs nighttime construction on its most heavily-traveled roadways to make infrastructure repairs under low-traffic conditions, while still moving the majority of people and goods during the day in an effective and energy-efficient manner.

A sizeable portion of this construction work may involve relocation of utility facilities. Currently, under existing law, most relocation costs are not reimbursed to the affected utilities. The utility industry has asked DOT to review the existing legislation and related policy regarding utility relocation. The industry seeks relief from the expenses it incurs when it is required to move its facilities because of a DOT project. DOT has had a long standing policy that it views as fair: access is provided to the right-of-way without any fees and while the purpose of the highway infrastructure is mainly for its customers, the traveling public and business, every effort is made to accommodate the needs of and the costs to the utilities. DOT continues to seek ways to reduce overall project costs, including utility relocation, and has modified its policies and procedures, consistent with existing state law, regarding when and how utilities are reimbursed. DOT continues to work with the utilities to make the process more efficient and reduce costs by developing projects more closely with the utility industry, precisely identifying the locations of utilities and, if possible from a highway and safety standpoint, designing around them. This approach is becoming more critical as the demand for use of the right-of-way expands with new technology. DOT is willing to share its successful approach with interested municipalities on their projects, which constitute the largest number of relocations.

Encourage Use of More Fuel-Efficient Vehicles

Efforts to encourage energy efficiency in transportation have traditionally focused on encouraging the shift from SOVs to multi-occupant vehicles. While the fuel efficiency of the vehicle is unchanged, the multi-occupant vehicle trip is many times more energy-efficient than a SOV trip. Some government programs promote the purchase of more fuel-efficient vehicles, require stricter fuel economy standards on manufacturers (see later section on CAFE standard), and offer tax rebates for the purchase of alternative-fuel vehicles. Each of these measures will provide some incentive for the traveling public to buy and use more fuel-efficient vehicles.

The Quality Communities Initiative

The Governor's Executive Order 102 created an interagency Quality Communities Task Force that was charged with studying community growth in New York and assisting communities in implementing effective land development, preservation, and rehabilitation strategies that promote both economic development and environmental protection. The Task Force's report, *State and Local Governments Partnering for a Better New York,* identified elements critical to Quality Community development and

defined the challenges inherent in that development. Among the seven quality community principles recommended to improve the quality of life for the citizens of New York were enhanced transportation choices, more liveable neighborhoods, and sustainable development.

DOT's participation on the Task Force reinforced the need to ensure that transportation planned for a community is compatible with current and future community development. A number of programs have been implemented or expanded that will better address community objectives and, at the same time, result in more cost-effective delivery of energy or reduced transportation sector energy demands. These include: implementing new and enhanced rural public transportation in the North Country and countywide coordinated transit services in Sullivan County; planning for passenger intermodal transportation centers[2] in Binghamton, Jamaica, New Rochelle, Poughkeepsie, Saratoga Springs, Rochester, Utica and Tompkins County; and developing a freight intermodal terminal on Long Island. Successfully implementing these and other similar programs will result in less VMT, reduced congestion, and improved traffic flow, all leading to less fuel use and improved energy efficiency.

DOT's Main Street Initiative, where State highways traversing villages are reconstructed in ways that enhance the quality of life for residents and support the economic framework of rural "Main Streets," is underway across the State. Sidewalks, bicycle travel ways, and better transit access are all potential components of a Main Street initiative and encourage a more energy-efficient local transportation system.

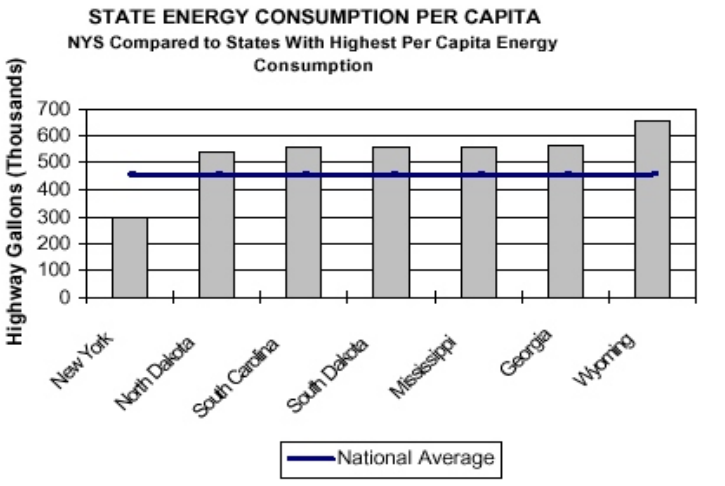
Public Transportation

An efficient, safe, and environmentally sound public transit system is essential to moving people in both rural and urban areas and is a fundamental part of the State's multi-modal transportation infrastructure. The State's extensive public transportation network provides mobility alternatives for residents in the State's urban areas that are essential to the health of New York's economy. Public transit also provides mobility for rural and elderly residents in the State's small towns and villages, without access to other modes of transportation, to travel to medical, social service, and other necessary services. A direct result of New York's extensive support for public transportation is the fact that

[2] Passenger intermodal transportation centers are locations where travelers can switch from one mode of travel to another. Examples include subway or rail stops at airports and bus terminals co-located at passenger railroad terminals.

the State has the lowest per capita energy use for transportation of any state in the nation. Energy consumption for transportation purposes in New York is approximately two-thirds the national average (Figure 8).

Figure 8



Source: U.S. Census Bureau, Census 2000 Redistricting Data (P.L. 94-171) Summary File and 1990 Census.

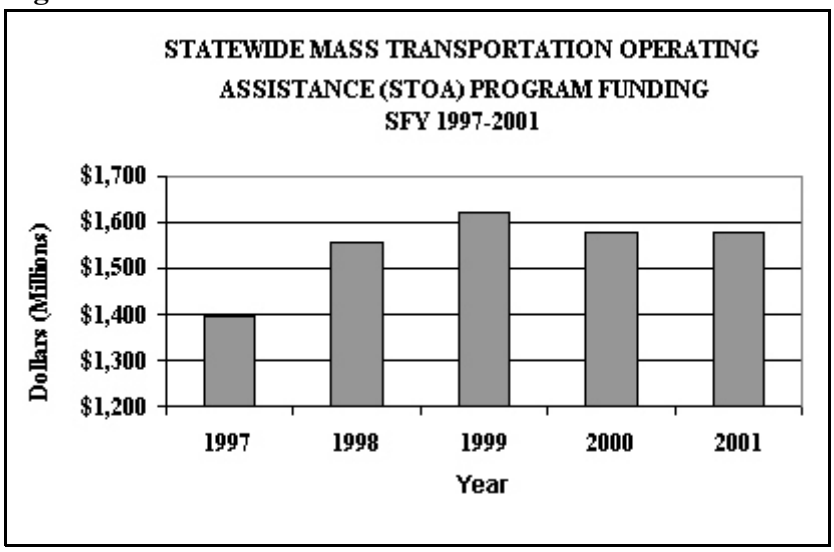
New York continues to experience an unprecedented increase in using public transportation. Transit ridership in New York not only accounts for one-third of the nation's ridership, but in 2000, more than 50% of the increase in national transit ridership occurred within the State. Much of the resurgence of public transit within the State can be attributed to the State's fiscal and fare policies (as discussed below). Based on analysis provided by the American Public Transportation Association (APTA), the average commuter who uses public transportation conserves approximately 200 gallons of gasoline annually when compared to driving alone. Based on this estimate, it is projected that the availability and convenience of public transportation in New York results in the conservation of more than 875 million gallons of gasoline or the equivalent of nearly 21 million barrels of oil annually.

State Public Transportation Assistance

Under the Governor's leadership, the State has made and will continue to make important capital and operating investments to improve New York's transportation system. New York provides approximately $1.6 billion in operating assistance annually for public transportation, more than any State in the nation. Not only does public transportation support economic and environmental policies, the State's significant financial assistance helps create energy efficiencies while at the same time mitigates traffic congestion in the State's major urbanized areas. Including the SFY 2001/2002 budget recommendation, State support for public transportation operating assistance has increased by approximately 22% since 1997 (Figure 9). This significant level of State

assistance has allowed transit systems to maintain and enhance public transportation services as well as enable the State and transit systems to support emerging public transportation needs, including the following: suburban mobility, welfare-to-work, special needs of the elderly, and accessibility for persons with disabilities. This strong support has enabled transit systems in the State's urbanized and rural areas to maintain fares at or below the national average making transit a viable and affordable transportation alternative. Assuming current funding levels, it is anticipated that the State will provide more than $8 billion in operating assistance over the next five year period, resulting in the conservation of more than 4.4 billion gallons of gasoline.

Figure 9



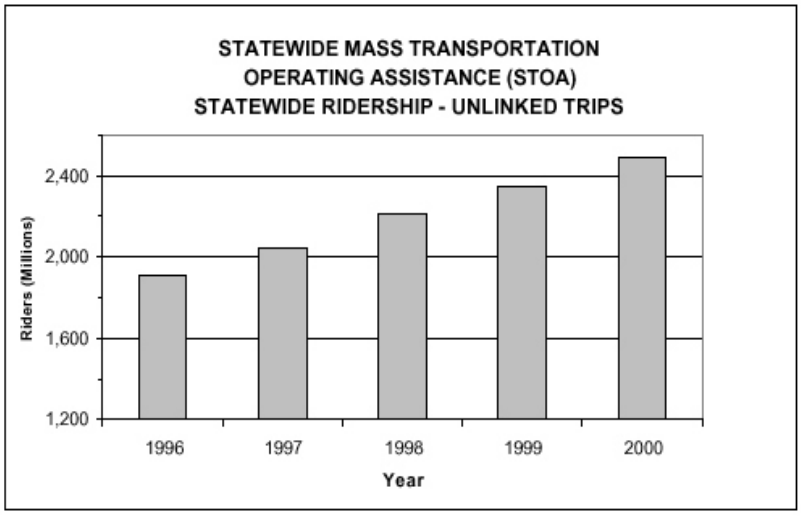
In addition, the Governor's multi-year capital program has identified nearly $2.2 billion in State funding for the Metropolitan Transportation Authority's (MTA) capital program for the 2000-2004 period. For systems other than the MTA, the multi-year program includes $146 million in capital assistance during this period. These new funds will be used for bus acquisition, maintenance facility improvements, and other regionally-significant capital projects that are expected to have a positive energy impact within the State.

Return on Investment

The return on State investment in public transportation is clear. In 2000, ridership on services receiving Statewide Mass Transportation Operating Assistance (STOA) increased by 7% to 2.4 billion trips annually - the largest ridership level since the program was authorized in 1974. Additionally, over the past five years, ridership statewide has increased by 31% (Figure 10). It is estimated that more than 70% of these trips are work-related, significantly supporting the State's economic growth. Assuming that current

growth continues for the national and State economies, that no major changes occur in local fare policies, and increased roadway congestion, it is estimated that State transit ridership will continue to increase over the next five years by approximately 5% annually to a level of 3.2 billion trips annually (Figure 11).

Figure 10

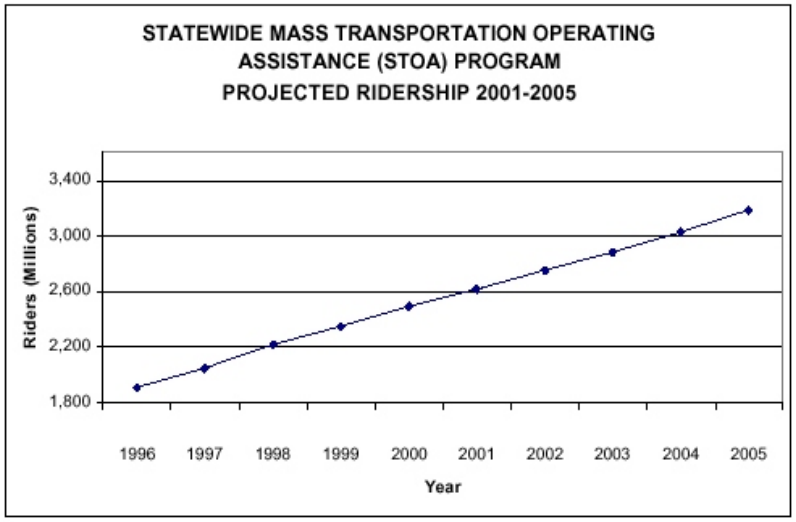


Source: New York State Department of Transportation

MetroCard Fare Policies/Incentives

Direct State support of public transportation has enabled transit systems in the State's urbanized and rural areas to maintain fares at or below the national average. In addition, the Governor has championed one of the most aggressive fare incentive policy programs in the nation within the New York City metropolitan area. In July 1997, MTA began implementing the MetroCard program on a system-wide basis for its operating services, for private bus services sponsored by the New York City Department of Transportation (NYCDOT), and for suburban bus service operated in Nassau County by MTA Long Island Bus (MTA-LIB). The MetroCard program, a series of fare discounts offered by MTA, has proven beneficial in terms of increasing transit ridership thereby mitigating highway

Figure 11



Source: New York State Department of Transportation

congestion and automobile pollution as well as increasing the State's overall energy efficiency.

The following are the fare discounts/incentives implemented under the MetroCard program since 1997**:**

- Free bus-to-subway or subway-to-bus transfer -- effectively eliminating the two-fare zone;
- Eliminated the fare for pedestrian passengers on the Staten Island Ferry;
- Established an 11-for-10 discount program whereby an individual who purchases 10 rides will automatically get the 11th ride for free;
- Reduced express bus fares by 25% (from $4.00 to $3.00); and,
- Implemented 30-day, 7-day, and 1-day fun passes, which provide unlimited use for those time periods.

As a result of fare incentives, ridership has dramatically increased on participating systems. For example, comparing the first half of 1997, before the MetroCard fare incentives went into effect, with the first half of 1999, after all the MetoCard fare incentives went into effect, finds that subway and bus ridership in New York City increased 19%. Nearly 5% of that increase can be explained by the increase in the number of jobs created in New York City. The remaining 14% can be explained by the fare incentive program. Similar ridership increases occurred on NYCDOT private bus and MTA-LIB services. Comparing 1996 annual ridership with 2000 annual ridership finds that NYCDOT ridership increased 33.8% and MTA-LIB ridership increased 16.6%. The State, through its Master Links initiative, is reviewing opportunities to extend MetroCard to all public transit services within the immediate New York City Metropolitan area.

Commuter Choice

The Governor has proposed a new transit initiative to reduce the need for individual commuting by New York State employees and further stimulate ridership for transit systems around the State. This new initiative will allow employees to set aside up to $1,200 annually in pre-tax income to pay for public transportation and other eligible commuter expenses. The pre-tax transit benefit will apply to most forms of public transportation services, including buses, trains, ferries, and vanpools.

Legislation is already in place that allows employers, including New York State, to establish pre-tax programs for implementing Commuter Choice programs. Commuter Choice offers the opportunity for New York's already energy-efficient transportation system to become even more energy-efficient (see the discussion on the transportation/energy/air quality connection).

Ferries

Over the past several years there has been a resurgence in the use of ferries in New York. This resurgence has been especially noticeable in the New York City area, where 15 ferry routes are operated carrying approximately 100,000 passengers daily. The publicly- owned-and-operated Staten Island Ferry is by far the largest and serves 65,000 daily passengers free-of-charge. The remaining private operators, which started service after 1986, currently provide daily service to approximately 35,000 commuters. Ferries are one of the most energy efficient means of transporting people.[3] Accordingly, the presence of this ferry service has energy benefits not only because of its relatively low fuel consumption but also because of its ability to divert passengers from longer and more congested automobile trips.

Bicycle and Pedestrian Initiatives

Pedestrian and bicycle travel provides many benefits for the community. These include improved mobility, public health, and environmental quality, while at the same time reducing vehicle congestion, emissions, and energy consumption. The State, through its Bicycle and Pedestrian Program at DOT, promotes the benefits of bicycling and walking as an alternative to the continued-reliance on motorized vehicles for all trips. DOT recognizes engineering, encouragement, and education as the keys to making the State more walkable and bikeable, and therefore, more energy-efficient.

According to the 1995 NPTS statistics for New York, 14.7% of all trips in the State are made by bicycling or walking, accounting for 1.2% of all personal miles traveled or 1.1 million miles annually. Statistics from the 1994 National Bicycling and Walking Study indicate that replacing automobile trips with non-motorized, energy-efficient bicycling or walking trips would save between $.05 and $.22 for every

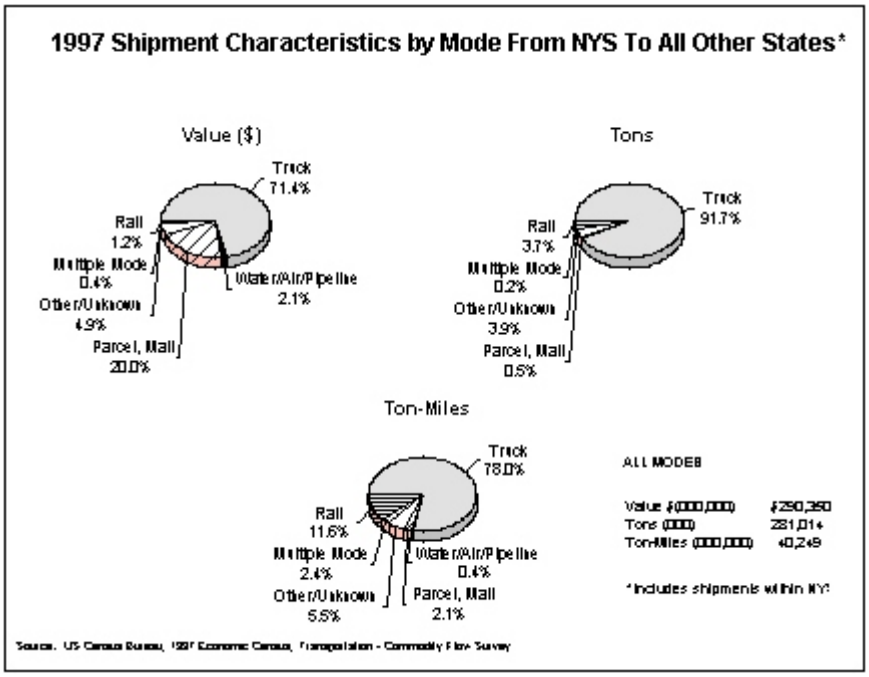
[3] Again using the Staten Island Ferry as an example, its large Kennedy Class boats can carry upwards of 6,000 persons per trip. The Staten Island Ferry removes a significant percentage of potential automobile commuters from extremely congested highways and bridges that connect Staten Island with Manhattan.

automobile mile displaced, or between $55 millon and $242 million annually. To promote walking and bicycling, the State has created or sponsored thousands of miles of on-road bicycle facilities (including over 1,200 miles of State bicycle routes), tens of thousands of miles of sidewalk, and over 16,000 miles of shared use and special use paths. The State has recently changed its policy to allow stand alone bicycle or pedestrian projects within the right-of-way of a local road to be eligible for State funding to further encourage this mode of travel. Previously, bicycle lanes or pedestrian walkways had to be part of an ongoing roadway project to be eligible for funding.

An important aspect of encouraging walking and cycling in New York is to have seamless linkage between walking and bicycling, and public transportation trips. National surveys have shown that many persons would walk or ride their bicycles to get to public transportation, if appropriate facilities were provided. Bicyclists would be more willing to use public transportation if provided with: (1) suitable bicycle parking facilities where cyclists can store their bicycles, protected from the weather, theft, and vandalism; and, (2) bicycle racks on buses, thereby expanding the range that cyclists may practically use their bicycles. For pedestrians, the facilities needed include: (1) a secure, well maintained shelter; and (2) access to bus stops provided through designated paths or walkways and effective street crossings that provide a direct linkage between their home or work, and the transit stop.

Intermodal Transportation

Figure 12



The trend in the movement of both passengers and freight is toward intermodal transportation. Intermodal transportation entails the use of multiple modes (*e.g.,* highway, rail, air, waterborne) of transportation to take advantage of the

efficiencies and flexibility of each mode for specific portions of a trip. Figure 12 shows the distribution of freight shipments in New York by various modes. Freight shipments from New York were valued at nearly $300 billion in 1997, the latest year for which data are available, representing over 280 million tons. This is up significantly from 1993 levels of over $260 billion and 220 million tons. Freight shipments by truck were the predominant mode of shipping, representing about three-fourths of all freight shipments. The advantages of developing multi-modal or intermodal alternatives include cost-efficiency through increased competition, increased transportation capacity through non-highway modes, and energy savings due to the energy efficiencies of modes other than personal passenger cars or trucks used for intercity freight movement.

Technologies for truck and rail intermodal transportation effectively reduce energy use. Container-on-flatcar (COFC) and trailer-on-flatcar (TOFC) and bulk cargo transfer technologies are both cost- and energy-efficient. To date, New York has not been able to take full advantage of these intermodal technologies because of vertical clearance restrictions on rail lines serving some major markets, such as New York City and Long Island, and because of the lack of intermodal transfer facilities. The State, in partnership with the Canadian Pacific Railroad, is working to address these physical constraints to enable full intermodal freight access to all areas of the State. Specific initiatives underway or in the planning phase to better use existing rail and highway capacity, as well as reduce energy use include the following:

- Initiating a bridge-over-rail program that provides a minimum clearance of 17'-6" for TOCF and COFC trains and subsequently 20'-6" of clearance for all structures between Montreal and New York City.

- Expanding the number of rail car barges and improving the rail infrastructure at the New York Harbor to provide direct rail access from either Staten Island or New Jersey to Brooklyn and other points in the New York City and Long Island area. This will divert truck traffic to rail and also eliminate the need for New York City rail traffic originating in the southern U.S. to be routed via Albany.

- Continuing development of a proposed freight intermodal center at the Pilgrim State Hospital site in Islip, Long Island. This intermodal center will become a key facility for freight movement onto Long Island.

- Continuing ongoing work with other New York City-based agencies to identify and implement improved rail access and intermodal facilities. Initiatives under study include a rail tunnel between Staten Island or New Jersey and Brooklyn, improved freight port facilities in Brooklyn, and establishing a major freight intermodal facility at Maspeth, Queens.

In addition to these specific initiatives, the State is working with the major railroads to identify projects in New York that can increase rail capacity, promote intermodal transportation, and provide improved rail access for economic development.

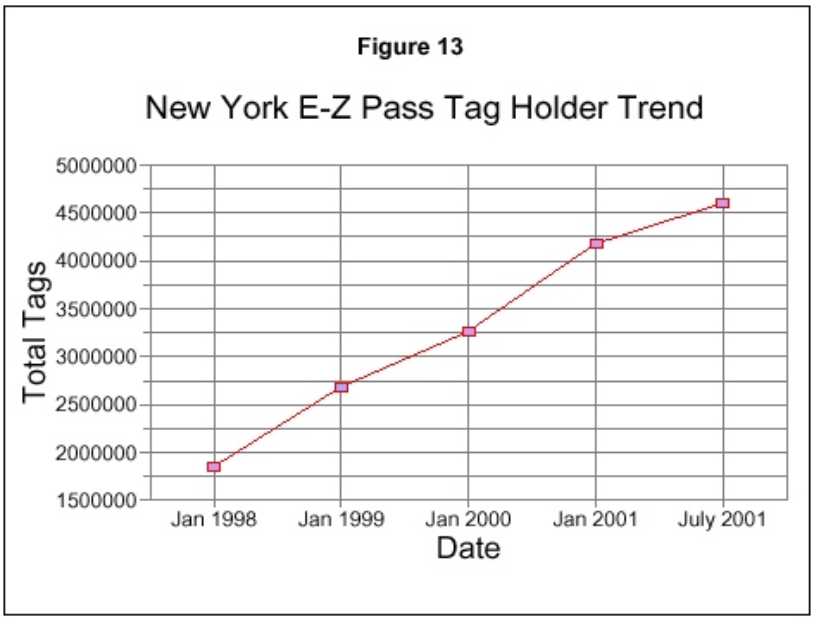
INNOVATION AND NEW TRANSPORTATION TECHNOLOGIES

As in telecommunications and many other arenas, the use of new technologies and development of innovative applications of existing technologies to transportation serves to advance the state of practice and also makes the transportation system more energy-efficient. Innovative approaches to congestion and ridership patterns enable the transportation system to meet basic transportation needs of the public within the context of the current network.

Intelligent Transportation Systems

New advances in this technology are allowing even faster speeds through toll plazas, further reducing fuel use at these sites. A prime example is the E-Z Pass system, which has seen significant growth in use due to its ability to reduce delays at toll barriers. Figure 13 shows the trends in the numbers of vehicles using E-Z Pass tags.

Figure 13



ITS applies advanced technologies, such as information processing, communications, computer controls, and electronics to implement new management, control, and information systems that improve transportation safety and energy efficiency, reduce congestion, enhance mobility, minimize adverse environmental impacts, and promote economic productivity. DOT is advancing a statewide ITS program called NY

MOVES. Strategic deployment plans for this program have been developed for each of the major metropolitan areas of the State (New York City, Long Island, Hudson Valley, Albany, Rochester and Buffalo are complete - Syracuse is still being developed), as well as the small urban and rural areas.

The following sections summarize some of the key elements of ITS that are expected to significantly reduce transportation energy use in the State. Table 1 highlights the energy benefits of these type of projects. By 2006, ongoing and planned ITS projects are expected to reduce vehicle delay by about 42,000 hours daily.

TABLE 1
Energy Benefits of ITS Projects

	Reduced Delay/Travel Time	Reduced Fuel Consumption
Freeway Management Systems:	30% reduction in travel time for recurring delay, 60% for non-recurring delay	Up to 41% during congestion periods
Incident Management Programs:	Time to detect and clear incidents on the Gowanus Expressway reduced for 90 minutes to 31 minutes (61%) with breakdowns reduced to 19 minutes	Predicted fuel reduction of 41.3 million gallons (42%)
Traffic Signal Systems:	17 - 37%	6 - 12%

Traffic Management Systems

Traffic Management Systems involve deploying sensors and traffic control devices to quickly detect and respond to traffic incidents. They facilitate improved real-time management of traffic on freeways and arterials, alert incident management patrols that assist motorists, and improve traffic signal timing and operations. Also included are automated systems that can expedite traffic flow at international border crossings.

Traveler Information Systems

Providing timely, accurate information on routing and current travel conditions allows travelers to make smart choices on the best route, time, and mode, allowing motorists to travel more efficiently and save fuel. A study of Long Island's INFORM

system[4] showed a doubling of reported diversions to avoid delay when active messages providing specific routing information (such as *Delay Ahead - Choose X Alternate Route*) were used rather than passive messages that provided general information (such as *Delay Ahead - Choose Alternate Route*).

Public Transportation and Multimodal Traveler Information Systems

Sustaining the high levels of transit ridership that account for New York's uniquely energy-efficient transportation network requires careful attention to the needs of the transit rider. Providing reliable, convenient, comfortable, and easy-to-navigate service is essential to sustaining ridership among customers with transportation choices.

Transit ITS systems are becoming increasingly popular among New York's transit providers. Transit ITS has three major emphasis areas:

- Increasing the efficiency and reliability of transit service by managing the fleet based upon real-time performance information;
- Improving customer access to service information such as customized itineraries that permit them to navigate the transit system from door-to-door, or next-bus arrival information at bus stops to improve the customer's confidence in the reliability of the service; and
- Improving the convenience of transit use by providing more options and ease in fare payment.

Nearly all the major urban transit systems in New York have or are procuring automated vehicle location (AVL) systems. These systems provide dispatching and control centers with real-time information on bus location and on-time performance information.

ITS Research and Development

The State actively participates in the national ITS Automated Highway System program. This is a long-term program that is assessing and developing prototype systems to automate the vehicle/driver operation so that vehicles can safely travel at high speeds

[4] USDOT Report No. FHWA/TX-99/1790-3 "ITS Benefits: Review of Evaluation Methods and Reported Benefits" October 1998.

and close headways. This system has the potential to double the capacity of each highway lane, significantly reducing congestion and accruing the associated energy benefits of more consistent speeds, fewer stops, and less time idling. While an automated highway system is estimated to be at least 20 years from becoming fully-operational, this research should lead to incremental improvements in vehicles, accruing benefits within the next few years. A prototype system was tested in San Diego, California in 1997.

High Speed Rail Program

The State and Amtrak are advancing a $200-million program to bring high-speed rail service from New York City, through Albany and on to Buffalo (the Empire Corridor). The program includes the re-manufacturing of seven high-speed turboliner trainsets as well as track and signal improvements. The High Speed Rail Program will reduce travel time, offer more frequent and reliable service, and improve passenger amenities, resulting in an expected increase in ridership along the Empire Corridor by as much as 150 percent. This ridership increase means less automobile travel, resulting in substantial time and energy savings.[5] Rail infrastructure projects include safety improvements at both public and private grade crossings, new track, bridge rehabilitation, curve straightening, and signal improvements.

DOT is also testing the feasibility of a new military propulsion technology to improve the third-rail propulsion systems on the trainsets. The new technology involves light-weight, high-speed motors and control systems recently developed for the military and now available for civilian applications.

ALTERNATIVE FUELS AND ALTERNATIVE FUEL TECHNOLOGIES

One of the most prominent and significant developments in recent years has been alternative-fueled vehicles (AFVs) and the technology and infrastructure associated with them. This technology is a highlight example of innovation and application of new (as well as existing) technology in the transportation sector.

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[5] The new turboliners will have two-1600 horsepower diesel turbine power units -- one in each of the two locomotives, which will be located at opposite ends of the train. The diesel power units are quieter, cleaner, more fuel efficient and less polluting than other passenger train equipment. Each trainset is also equipped to operate on third-rail electricity.

Alternative Fuel Vehicles

New York has been a leader in adopting programs and technologies that lead to improved energy efficiency and air quality. The State is leading by example to reduce reliance on imported energy and to improve air quality and energy efficiency by committing to the use of alternative-fuel vehicles and technology in its own fleet of vehicles. Governor Pataki's 1996 Clean Water/Clean Air Bond Act stipulated creating a clean-fueled vehicle program by the Office of General Services, for the purpose of acquiring clean-fueled vehicles for State use and testing, and for evaluating clean-fueled vehicle technologies. The driving force behind this program is the Clean-Fueled Vehicles Council (Council), established in 1998.[6] The Council ensured that State government would move quickly in a coordinated approach to using AFVs in its daily operations. In mid-1999, the Council began formulating a comprehensive fueling infrastructure plan to accommodate the State's growing fleet of AFVs. In formulating an overall statewide infrastructure plan, compressed natural gas (CNG) was determined to be the most suitable fuel at this time.

When fully implemented, a two-phase plan will double the number of existing CNG fueling stations in the State. Phase I calls for 30 low-volume FuelMaker CNG sites at DOT facilities across the State. These sites are open to State vehicles only, and are capable of producing up to 100 gallons of CNG per day. The first station was opened in June 2000 and since then, 29 more have opened. Phase II calls for up to 16 high-volume CNG stations capable of dispensing a minimum of 500 gallons per day under a joint public/private partnership. State agencies provide the land and the private-sector constructs and operates the fueling stations. These fast-fill CNG stations, installed strategically around the State at DOT, New York State Thruway, Office of General Services, and Corrections facilities will be commercially-operated and open to the public. The fuel infrastructure plan also addresses the need for other alternative fuels, and includes installing a number of electric vehicle charging sites. As an initial step, seven

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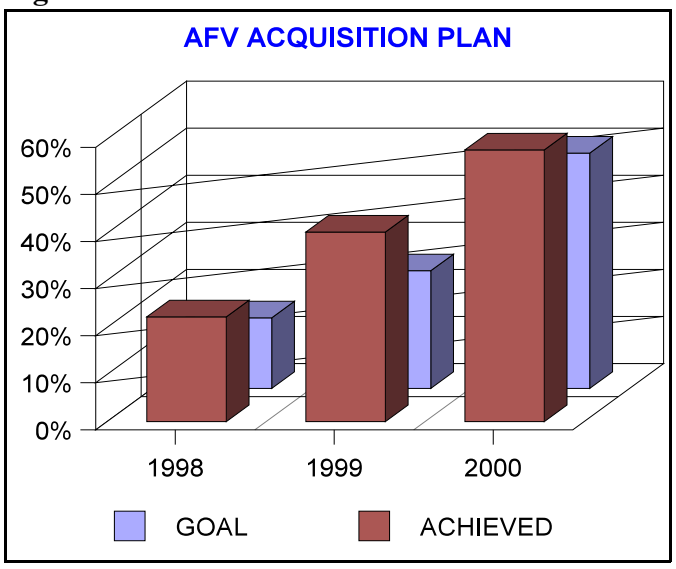
[6] The Clean Fueled Vehicles Council includes the following members:

- Department of Agriculture and Markets
- Department of Correctional Services
- Department of Environmental Conservation
- Department of Motor Vehicles
- Department of Transportation
- Division of the 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
- State University of New York
- Department of Taxation and Finance

charging stations have been installed at the Empire State Plaza in Albany to accommodate visitors. In addition, the feasibility of establishing ethanol and propane fueling stations is being addressed.

Figure 14



The Federal Energy Policy Act of 1992 (EPAct) requires State agencies to acquire AFVs in increasing annual percentages of their fleet light-duty vehicle purchases, beginning in model year 1997. EPAct further requires annual reporting to the U.S. Department of Energy (U.S. DOE). As shown in Figure 14, New York has exceeded federally- mandated acquisition requirements under EPAct for the past three years as follows:

1998 Goal 15%; NewYork achieved 22.25%
1999 Goal 25%; New York achieved 40.26%
2000 Goal 50%; New York achieved 57.70%

New York expects to continue to meet or exceed EPAct goals, which increase to 75% for 2001 and thereafter. As of July 1, 2001 New York has acquired 1,416 AFVs. In calendar year 2000, New York purchased 200,000 gasoline-gallon equivalents of CNG. In calendar year 2001, this figure jumped to 750,000 gasoline-gallon equivalents. New York is working with the Northeast states in a united effort to influence the direction of alternative fuel programs. The principal features of New York's clean-fueled vehicle program model - creative planning, multi-agency participation, and promoting favorable manufacturer relations - are strategies that can be easily adapted by other states.

To underscore the importance of AFVs in meeting New York's transportation, energy, and environmental goals, Governor Pataki, in Executive Order 111, directed that by 2005, at least 50% of State agencies' light-duty vehicle purchases must be AFVs. By 2010, this percentage increases to 100%. The Executive Order covers all agency vehicles, regardless of the number of vehicles in the agency's fleet or where they are assigned.

New York Power Authority Electric Transportation Program

The New York Power Authority (NYPA) Electric Transportation Program is actively engaged in initiatives that employ electricity as a transportation fuel to address concerns about clean air, noise pollution, and traffic congestion. NYPA is the nation's largest supplier of electricity for mass transit, powering the subway and commuter trains of metropolitan New York City. In addition, NYPA has put into service several hundred electric cars, light trucks, buses, vans, and other vehicles for use by its customers and at its own facilities. In 2000, those vehicles achieved the "million mile mark" for combined AFV-mileage, making NYPA the first utility in the Northeast to achieve this milestone. The array of NYPA electric vehicle projects includes hybrid-electric transit buses, station/commuter cars, all-electric school buses and shuttles buses, small urban electric vehicles and electric delivery vans and trucks. In October 2001, NYPA and Ford Motor Company's electric vehicle group, TH!NK Mobility, launched the "Clean Commute" commuter station car demonstration in cooperation with MTA, the New York State Energy Research and Development Authority (NYSERDA), the Long Island Power Authority, DOT, NYCDOT, and U.S. DOE. The demonstration program will lease 100 electric vehicles to passenger rail commuters in the metropolitan New York City region.

Alternative Fuel Technology for Transit

New York is a national leader in combining transportation improvements with environmental benefits and new energy technologies. In 1991, the State sponsored a consortium of transit systems interested in alternative fuel development. As a result of the initial consortium pilot, several transit systems around the State have committed to mainstreaming AFVs into their urbanized-area fleets. Most transit systems currently use CNG-powered buses and MTA-New York City Transit is also making a significant commitment to utilizing hybrid-electric buses. Incorporating alternative-fuel buses into transit fleets has steadily increased, from 31 in 1991 to more than 2,300 programmed through 2004. In addition, MTA-New York City Transit has stated that all of its purchases of standard-sized buses after 2004 will be as clean as AFVs. Relatedly, bus depots are being converted to facilities that can store and refuel these buses.

The most significant impediment to further expanding the use of AFV technology is its incremental cost and the associated infrastructure. To mitigate the impact of cost associated with AFV deployment, NYSERDA, in cooperation with DOT, has been providing competitive awards from the Clean-Fueled Bus Program (authorized under the 1996 Clean Water/Clean Air Bond Act) for the purchase of alternative fuel buses. The

Clean Fueled Bus Program makes funding available annually to cover the incremental cost of procuring alternative-fuel transit buses and infrastructure.

Alternative Fuel Technology for the Private Sector

To promote fuel diversity and efficiency, it is important that private sector fleets begin to adopt alternative fuel technologies. Progress is being made in this area, primarily as a result of government incentives. NYSERDA is using approximately $6 million of federal Congestion Mitigation and Air Quality Program (CMAQ) funds to support introduction of natural gas, electric, and hybrid-electric vehicles in New York City, including heavy-duty trucks, delivery vehicles, and taxis. A similar program is operated on Long Island through the local Clean Cities organization. Other federal funds awarded to New York are used for projects to develop the necessary fueling infrastructure to support further introduction of alternative fuel vehicles in all sectors.

The New York Alternative Fuels Tax Credit program for placing these vehicles sunsets in 2002; the tax credit for manufacturers sunsets in 2003. The alternative fuel incentives described above have been a success. A program that includes all types of alternative-fuel, light-duty vehicles; medium- and heavy-duty vehicles for the same vehicle technology; and incentives for alternative fuel providers to encourage their availability (such as a credit for every gallon of gasoline equivalent provided and a credit for installation costs of alternative fuel infrastructure) is expected to induce even greater penetration of these vehicles into fleets.

Energy Research Program

New York is committed to investigating and testing the economic, energy, and environmental factors aggressively for all emerging alterative-fuel technologies and to advance the most appropriate technologies and combinations of technologies that address and support the State's needs. Based on viability and cost effectiveness, CNG and liquefied natural gas (LNG) are currently the focus of short-term and long-range planning. New York promotes the research, development, deployment, and use of all fuels and technologies designed to improve air quality and reduce the reliance on conventional energy sources.

The Clifton Park Rest Area on Interstate Route 87 was selected by NYSERDA to demonstrate fuel cell technology. Three 7.5-kW-rated fuel cells are being tested there, and three additional fuel cells were recently installed at a Saratoga County maintenance

facility. Funding was provided from the 1996 Clean Water/Clean Air Bond Act. In collaboration with other State agencies, authorities, universities, and private industry, the DOT State Planning & Research Program (SPR), makes funding available for research projects, many of which will reduce the demand for transportation-sector energy.

THE TRANSPORTATION/AIR QUALITY/ENERGY CONNECTION

New York continues to be a national leader in meeting the challenges of improving air quality in all parts of the State. Although New York's air quality continues to steadily and dramatically improve, there is still much to be done, especially in the New York City metropolitan area. Transportation has a role in achieving air quality goals through more energy-efficient transportation systems.

Lead emissions and concentrations have been reduced to the point where lead is no longer considered a transportation-related air pollutant. Carbon monoxide levels and particulate matter less than 10 microns (PM_{10}) have also improved to such an extent that attaining National Ambient Air Quality Standards is anticipated soon. Meeting the one-hour ozone, eight-hour ozone, and particulate matter less than 2.5 microns standards, however, will require more effort. A list of transportation measures that are under consideration to reduce emissions of ozone precursors and, thereby, help lower ozone concentrations is shown in Table 2. The list includes measures that have been considered previously in New York or elsewhere in the nation. It also includes measures that have not been traditionally considered as transportation actions available to reduce emissions (*e.g.,* construction and maintenance equipment). Each measure also has costs to government or industry that affect its feasibility as an emissions reduction alternative.

The measures in Table 2 are being considered in a three-phased approach. The first phase has DOT taking actions to improve air quality. Given the size and importance of its capital programs, DOT can influence other transportation agencies to take similar steps. The second phase includes the Federal government and other regional and local governments. Collectively, these governments can provide substantial air quality benefits through coordinated implementation efforts. The last phase carries this effort to include the private sector in the metropolitan areas, which can yield maximum emissions reduction benefits. For improving air quality, the more effective measures include limiting emissions from construction and maintenance equipment; implementing Commuter Choice and Ozone Action Day programs; limiting emissions from bridge painting and traffic marking operations; coordinating traffic signals; and retrofitting diesel equipment. Some measures that improve air quality also reduce energy use, such

as the Commuter Choice and Ozone Action Day programs. Replacing standard traffic signal light bulbs with energy-efficient light emitting diodes (LEDs), enhancing transportation system management measures (such a carpooling, van pooling, *etc.*), and enforcing speed limits can provide substantial energy benefits, but the last two measures are not particularly effective in reducing ozone precursor emissions. The measures listed in Table 2 are shown in Table 3 for ozone precursor reductions and in Table 4 for energy reductions. Tables 3 and 4 also include information on program costs and cost-effectiveness. A measure that reduces ozone precursor emissions may not save energy.

New York is committed to operating an energy-efficient and low-polluting transportation system. Examining and analyzing the transportation system's energy consumption and air emissions when long-range plans and Transportation Improvement Programs are adopted would enhance this commitment. This examination could be on a build/no build basis and include public review. If a plan or a program increases air emissions or uses more energy than doing nothing at all, additional measures or modifications to the plan or program could be considered to minimize the increases as much as practicable. This review would be in addition to existing federal and State requirements to address transportation conformity regulations in air quality non-attainment and maintenance areas.

ENERGY ISSUES RELATED TO TRANSPORTATION ENERGY AT THE FEDERAL LEVEL

The Federal Transportation Equity Act for the 21st Century (TEA-21) provides funding for highways and transit. TEA-21 expires on September 30, 2003. Work has already begun to reauthorize TEA-21. The reauthorized TEA-21 would help New Yorkers conserve energy and reduce pollution while enhancing the mobility and safety of goods and people to expand the regional economy.

Increase Federal Funding For Transit

New York has one-third of the nation's transit users. As a result of this heavy transit use, New York has the lowest-per-capita gasoline consumption in the nation. Transit ridership is growing at record rates nationwide, but especially in New York. The core capacity of New York's transit system is inadequate to meet this new demand for service. Increased federal transit funding is needed to maintain the existing system and increase its capacity.

TABLE 2

Possible Transportation Actions to Reduce Emissions

Possible Actions	
Construction equipment: limit/avoid use of heavy duty off-road equipment. Continue and expand nighttime construction. Limit use of equipment to p.m. periods and Ozone Action Days.	Enhance bicycle/pedestrian programs e.g bike racks on busses, bike lanes, pedestrian crossings, and connections.
Maintenance equipment: limit/avoid use of small and medium engine equipment such as lawn mowers/tractors, chainsaws, and weedwackers. Limit use of equipment to p.m. periods and Ozone Action Days.	Alternative fuels: private, transit, state, local fleets conversions to alternative fuels, promote/reward use of alternative fuels, clean engines in construction/maintenance equipment.
Ozone Action Days: continue Ozone Action Days. Extend public education/outreach to encourage alternative travel and avoid actions that pollute.	ITS: improved incident response, corridor management with optimized signals.
Commuter Choice, Parking Cash-out programs.	Speed limit reduction and enforcement.
Architectural coatings: limit bridge painting to p.m. periods and Ozone Action Days.	Programs for improved public transit: expand and enhance service, discounts tied to Ozone Action Days and employer incentives.
Replace fixed-time and semi-actuated traffic signals with fully actuated signals to reduce delay and idling.	Congestion pricing measures at tolled facilities to reduce vehicle usage, perhaps tied to Ozone Action Days.
Replace bulbs with LEDs in traffic signals.	Increase HOV requirement to 3+.
Maximize coordination of traffic signals.	Increase park and ride facilities.
Transportation management plans for employers to encourage ridesharing, vanpooling, telecommuting, flex time, and guaranteed ride home.	Aircraft and ground support operational and maintenance controls.
Freight improvement projects, convert freight carried by truck to other modes.	Limitations and enforcement on idling.
Retrofit of existing engines with catalytic converters, particulate traps, etc to reduce emissions.	

Table 3. Potential Ozone Precursor emission reductions from transportation actions

		Tons/Day		Annual Program Costs for Maximum Benfits		Dollars/Ton/Day Reduced for Maximum Benefits	
		NOx	VOCs	NOx	VOCs	NOx	VOCs
1 Construction							
	Total Metropolitan Area	5.3 - 29	1 - 6.2	$5,257,643	$10,000,000	$500	$4,386
	Government Component	0.9 - 5	0.1 - 2.3	$841,223	$5,000,000	$500	$5,839
	NYSDOT Component	0.1 - 0.7	0.02 - 0.4	$136,699	$1,000,000	$500	$6,387
2 Maintenance							
	Total Metropolitan Area	0.02 - 0.03	1.4 - 4.4	$1,051,529	$2,000,000	$83,504	$1,247
	Government Component	0.001 - 0.007	0.03 - 0.5	$168,245	$1,000,000	$69,828	$5,543
	NYSDOT Component	0.0002 - 0.001	0.005 - 0.09	$27,340	$200,000	$68,082	$5,912
3 Ozone Action							
	Total Metropolitan Area	4.3	3.0	$1,500,000	$1,500,000	$945	$1,391
	Government Component	4.3	3.0	$1,500,000	$1,500,000	$945	$1,391
	NYSDOT Component	4.3	3.0	$1,500,000	$1,500,000	$945	$1,391
4 Commuter Choice							
	Total Metropolitan Area	0.5 - 6.9	0.4 - 4.6	$123,750,000	$123,750,000	$49,136	$73,705
	Government Component	0.5 - 6.9	0.4 - 4.6	$123,750,000	$123,750,000	$49,136	$73,705
	NYSDOT Component	0.0	0.0	NA	NA	NA	NA
5 Coating							
	Total Metropolitan Area	0	0.03 - 3.9	NA	$3,489,714	NA	$2,452
	Government Component	0	0.03 - 0.56	NA	$542,844	NA	$2,656
	NYSDOT Component	0	0.03 - 0.5	NA	$92,284	NA	$506
6 Signals-replace fixed time with Actuated							
	Total Metropolitan Area	0.154	0.463	$4,671,875	$4,671,875	$83,012	$27,671
	Government Component	0.154	0.463	$4,671,875	$4,671,875	$83,012	$27,671
	NYSDOT Component	0.020	0.061	$703,125	$703,125	$95,506	$31,835
7 LED							
	Total Metropolitan Area	0.04	0.01	-$15,923,561	-$15,923,561	NA	NA
	Government Component	0.04	0.01	-$15,923,561	-$15,923,561	NA	NA
	NYSDOT Component	0.005	0.001	-$2,396,523	-$2,396,523	NA	NA
8 Signals-coordinate							
	Total Metropolitan Area	0.23	0.69	$1,495,000	$1,495,000	$20,375	$6,792
	Government Component	0.23	0.69	$1,495,000	$1,495,000	$20,375	$6,792
	NYSDOT Component	0.03	0.09	$225,000	$225,000	$20,375	$6,792
9 TransMgmt							
	Total Metropolitan Area	0.26	0.19	$27,500,000	$27,500,000	$288,302	$388,188
	Government Component	0.26	0.19	$27,500,000	$27,500,000	$288,302	$388,188
	NYSDOT Component	0.18	0.07	$7,500,000	$7,500,000	$116,485	$290,225
10 BikePed							
	Total Metropolitan Area	0.036	0.02	$4,345,511	$2,437,726	$327,090	$327,090
	Government Component	0.036	0.02	$4,345,511	$2,437,726	$327,090	$327,090
	NYSDOT Component	0	0	NA	NA	NA	NA
11 AltFuels							
	Total Metropolitan Area	27.4	-0.19	$126,147,408	NA	$12,610	NA
	Government Component	7.6	-0.05	$35,000,000	NA	$12,610	NA
	NYSDOT Component	0.01	0	$40,000	NA	$10,959	NA
12 ITS							
	Total Metropolitan Area	-0.01	0.077	Net Savings	Net Savings	NA	NA
	Government Component	-0.01	0.077	Net Savings	Net Savings	NA	NA
	NYSDOT Component	-0.01	0.077	Net Savings	Net Savings	NA	NA
13 SpeedLim							
	Total Metropolitan Area	0.68	0.087	$14,040,000	$14,040,000	$56,872	$440,662
	Government Component	0.68	0.087	$14,040,000	$14,040,000	$56,872	$440,662
	NYSDOT Component	0	0	NA	NA	NA	NA
14 PubTrans							
	Total Metropolitan Area	0.12	0.37	$2,500,000	$2,500,000	$57,078	$18,512
	Government Component	0.12	0.37	$2,500,000	$2,500,000	$57,078	$18,512
	NYSDOT Component	0	0	NA	NA	NA	NA
15 Cong Pricing							
	Total Metropolitan Area	0.2	0.3	$52,328,065	$52,328,065	$645,161	$444,444
	Government Component	0.2	0.3	$52,328,065	$52,328,065	$645,161	$444,444
	NYSDOT Component	0	0	NA	NA	NA	NA
16 HOV increase							
	Total Metropolitan Area	0.01	0.01	$750,000	$750,000	$205,479	$205,479
	Government Component	0.01	0.01	$750,000	$750,000	$205,479	$205,479
	NYSDOT Component	0.01	0.01	$750,000	$750,000	$205,479	$205,479
17 ParkRide							
	Total Metropolitan Area	0.033	0.029	$13,500,000	$13,500,000	$500,739	$563,331
	Government Component	0.033	0.029	$13,500,000	$13,500,000	$500,739	$563,331
	NYSDOT Component	0.08	0.03	$9,000,000	$9,000,000	$306,686	$727,361
18 Aircraft Support							
	Total Metropolitan Area	7.83	1.5	$12,800,000	$12,800,000	$82,295	$82,295
	Government Component	0.23	0.036	$12,800,000	$12,800,000	$82,295	$82,295
	NYSDOT Component	0.01	0.01	$252,000	$252,000	$69,041	$79,674
19 Idling							
	Total Metropolitan Area	0.02	0.03	$14,040,000	$14,040,000	$1,966,493	$1,433,416
	Government Component	0.02	0.03	$14,040,000	$14,040,000	$1,966,493	$1,433,416
	NYSDOT Component	0	0	NA	NA	NA	NA
20 Retrofit							
	Total Metropolitan Area	0	0.54	NA	$5,250,000	NA	$52,798
	Government Component	0	0.54	NA	$5,250,000	NA	$52,798
	NYSDOT Component	0	0.27	NA	$2,625,000	NA	$26,556
21 Freight							
	Total Metropolitan Area	0.6	0.1	$254,200,000	$254,200,000	$1,151,812	$4,730,850
	Government Component	0.6	0.1	$254,200,000	$254,200,000	$1,151,812	$4,730,850
	NYSDOT Component	0.6	0.1	$254,200,000	$254,200,000	$1,151,812	$4,730,85
TOTALS:							
	Total Metropolitan Area	5.9 - 77.7	2.7 - 26.4	$643,953,469	$530,328,818		
	Government Component	1.4 - 26.1	0.6 - 13.9	$547,506,357	$521,381,949		
	NYSDOT Component	0.1 - 6.0	0.1 - 4.7	$271,937,641	$275,650,886		

NA - indicate no cost is applicable because no reduction of the corresponding pollutant is calculated.

Table 4. Potential energy reductions from transportation actions

		Emission Benefit (Btu/Day) Energy		Annual Program Costs for Maximum Benfits Energy	Dollars/Million Btu/Day Reduced for Maximum Benefits Energy
1 Construction					
	Total Metropolitan Area	15,479,820 –	29,421,422	TBD	TBD
	Government Component	4,707,427 –	13,947,933	TBD	TBD
	NYSDOT Component	764,957 –	2,549,857	TBD	TBD
2 Maintenance					
	Total Metropolitan Area		TBD	TBD	TBD
	Government Component		TBD	TBD	TBD
	NYSDOT Component		TBD	TBD	TBD
3 Ozone Action					
	Total Metropolitan Area		18,223,885,116	$1,500,000	$0.23
	Government Component		18,223,885,116	$1,500,000	$0.23
	NYSDOT Component		18,223,885,116	$1,500,000	$0.23
4 Commuter Choice					
	Total Metropolitan Area		54,237,488,333	$123,750,000	$6
	Government Component		54,237,488,333	$123,750,000	$6
	NYSDOT Component		0	NA	NA
5 Coating					
	Total Metropolitan Area		0	NA	NA
	Government Component		0	NA	NA
	NYSDOT Component		0	NA	NA
6 Signals-replace fixed time with Actuated					
	Total Metropolitan Area		551,875,988	$5,375,000	$27
	Government Component		488,034,293	$4,671,875	$26
	NYSDOT Component		63,841,695	$703,125	$30
7 LED					
	Total Metropolitan Area		939,257,600,000	-$18,320,083	NA
	Government Component		816,389,600,000	-$15,923,561	NA
	NYSDOT Component		122,868,000,000	-$2,396,523	NA
8 Signals-coordinate					
	Total Metropolitan Area		827,813,983	$1,720,000	$6
	Government Component		732,051,440	$1,495,000	$6
	NYSDOT Component		95,762,543	$225,000	$6
9 TransMgmt					
	Total Metropolitan Area		1,385,482,207	$29,000,000	$57
	Government Component		827,151,227	$21,500,000	$71
	NYSDOT Component		558,330,980	$7,500,000	$37
10 BikePed					
	Total Metropolitan Area		167,679,528	TBD	TBD
	Government Component		167,679,528	TBD	TBD
	NYSDOT Component		0	NA	NA
11 AltFuels					
	Total Metropolitan Area		0	NA	NA
	Government Component		0	NA	NA
	NYSDOT Component		0	NA	NA
12 ITS					
	Total Metropolitan Area		126,059,950	TBD	TBD
	Government Component		126,059,950	TBD	TBD
	NYSDOT Component		126,059,950	TBD	TBD
13 SpeedLim					
	Total Metropolitan Area		2,140,778,937	$14,040,000	$18
	Government Component		2,140,778,937	$14,040,000	$18
	NYSDOT Component		0	NA	NA
14 PubTrans					
	Total Metropolitan Area		379,816,993	$380,000,000	$2,741
	Government Component		379,816,993	$380,000,000	$2,741
	NYSDOT Component		0	NA	NA
15 Cong Pricing					
	Total Metropolitan Area		660,478,427	$134,047	$1
	Government Component		660,478,427	$134,047	$1
	NYSDOT Component		0	NA	NA
16 HOV increase					
	Total Metropolitan Area		0	NA	NA
	Government Component		0	NA	NA
	NYSDOT Component		0	NA	NA
17 ParkRide					
	Total Metropolitan Area		512,523,586	$22,500,000	$120
	Government Component		258,046,200	$13,500,000	$143
	NYSDOT Component		254,477,386	$9,000,000	$97
18 Aircraft Support					
	Total Metropolitan Area		TBD	TBD	TBD
	Government Component		TBD	TBD	TBD
	NYSDOT Component		TBD	TBD	TBD
19 Idling					
	Total Metropolitan Area		56,711,587	$14,040,000	$0
	Government Component		56,711,587	$14,040,000	$0
	NYSDOT Component		0	NA	NA
20 Retrofit					
	Total Metropolitan Area		0	NA	NA
	Government Component		0	NA	NA
	NYSDOT Component		0	NA	NA
21 Freight					
	Total Metropolitan Area		617,500	$254,200,000	$1,127,836
	Government Component		617,500	$254,200,000	$1,127,836
	NYSDOT Component		617,500	$254,200,000	$1,127,836
TOTALS:					
	Total Metropolitan Area		1,018,558,233,557	$827,938,964	
	Government Component		894,702,347,464	$812,907,361	
	NYSDOT Component		142,193,525,027	$270,731,603	

TBD - To be determined
NA - indicate no cost is applicable because no reduction of the corresponding pollutant is calculated.
Numbers in parentheses ( ) are negative cost values.

Communities across the nation are constructing new transit systems. The TEA-21 New Starts program provides funds to extend existing rail and subway systems or build new systems. Currently, 190 New Starts projects are authorized for development nationwide with a total value estimated at $ 75 billion. TEA-21 will make available approximately $6.1 billion to develop these projects. In New York, the authorized New Starts projects that have received federal funding are listed in Table 5. To meet the current demand for new transit service, Congress must increase New Starts funding in the next Surface Transportation Act.

TABLE 5

New York TEA-21 New Start Projects with Funding Authorizations

Project	FFY 1998-2003 Authorization	Appropriations through FFY 2002	% of Authorization
Long Island Rail Road East Side Access	$353.0	$68.2	19.3%
Second Avenue Subway	$5.0	$2.0	40.0
Staten Island - Whitehall Intermodal Terminal (1)	$40.0	$6.9	17.3%
Nassau Hub	$10.0	$0.5	5.0%
St. George's Ferry Intermodal Terminal	$20.0	$2.5	12.5%
Midtown-West Ferry Terminal (2)	$16.3	(2)	--
Total Authorization/Appropriation	$444.3	$80.1	18.0%

(1) FFY 2001 appropriation allocated to Whitehall/St. George.

(2) Project received $16.3 million appropriation from FHWA in FFY 2000.

Retain the Congestion Mitigation And Air Quality Program

The 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. 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, and other transit projects in communities across the State. CMAQ funding is also an important source of funding for Governor Pataki's High Speed Rail Plan. The CMAQ has a vital role in New York's energy conservation strategy.

Continue Funding for ITS and Transportation System Operations

Information technology is an important tool for improving the energy efficiency of the transportation system. TEA-21 provides funds to deploy ITS technologies that provide traveler information, help manage traffic incidents, manage traffic flow, improve the movement of freight, ease the connections between modes, and provide data on the

system's condition and performance. Continued federal funding for ITS will help make the transportation system operate more efficiently and save energy.

Modify TEA-21 Programs To Improve Rail Service

Freight traffic is expected to double in the next 20 years. The highway system cannot absorb this traffic growth. The Northeast Association of Transportation Officials (NASTO) is leading an effort of to prepare a strategic multimodal international freight investment plan for the Northeast trading bloc, which extends from Halifax, Nova Scotia to Norfolk, Virginia to Chicago, Illinois. The plan will identify major bottlenecks in the existing freight transportation system and recommend strategic capital and operating improvements for the regional system.

Although TEA-21 is primarily aimed at providing federal funding for the highway and transit systems, some elements of TEA-21 are designated for improving rail service. The Transportation Infrastructure and Innovation Act of 1998 (TIFIA) provides loan guarantees and credit enhancements for major rail transportation projects. 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. TEA-21 also established 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.

Corporate Average Fuel Economy Standards

Since the initial oil crisis in 1973 and throughout subsequent episodes in the late 1970s, passenger automobile fuel economy has been a significant transportation energy issue. The authority to administer a program for regulating new passenger and light-truck fuel economy standards was delegated to the Secretary of Transportation by the Motor Vehicle Information and Cost Savings Act of 1972. In 1975 the Energy and Conservation Act established Corporate Average Fuel Economy (CAFE) standards that 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 for model year (MY) 1985 and have been frozen at that rate through MY 2002. Light-duty truck standards have been frozen at the 1996 rate of 20.7 miles-per-gallon through MY 2002. Increasing the CAFE standards for passenger cars and light-duty trucks for model years beyond 2002 will conserve energy.

Given the most recent national VMT projections, which assume that annual highway investment will stay at the 1997 funding level for the next 20 years, urban VMT can be expected to increase at an annual average rate between 1.78% and 1.83%. Rural VMT can be expected to increase at an annual average rate between 2.68% and 2.72%. Conversely, vehicle fuel economy performance for passenger cars and light-duty trucks has decreased by 1% over the 10-year period from 1990 to 2000. Fuel economy performance for the entire fleet was 25.4 mpg in 1990 and at 25.2 mpg in 2000.

FINDINGS AND CONCLUSIONS

- New York has the most energy-efficient transportation sector in the United States due to its high-per-capita-use of transit. One-third of all national transit trips are in New York. The use of public transportation is experiencing unprecedented growth, averaging approximately 5% annually.

- Statewide, vehicle miles traveled (VMT) and congestion (especially urban congestion) continue to increase, but VMT should grow at a slower rate in the future. Transportation system management, technology improvements, and capital construction projects are underway to reduce the growth in congestion. Freight truck traffic increases are of concern.

- Bicycle and pedestrian initiatives, passenger ferry service, intermodal passenger and freight capabilities, and high-speed rail efforts are important measures to increase the energy efficiency of New York's transportation sector.

- New York has made a significant commitment in alternative-fueled vehicle (AFV) technology. More than 1,400 State-owned AFVs and over 50 commercial compressed natural gas stations are in use. Executive Order 111 requires State agency purchase of light-duty vehicles to be 100% AFV by 2010.

- Progress in reducing the transportation sector's energy use and air emissions is ongoing and will continue in the future through measures such as Commuter Choice, Ozone Action Days, and traffic signal coordination. Quantitative build and no-build energy and emissions analyses of transportation plans and programs would facilitate continued energy and environmental benefits.

- Energy efficiency can be enhanced by actions at the federal level. Reauthorizing federal surface transportation legislation can substantially affect New York's status as the most transportation-energy-efficient state by providing for transportation programs that enhance energy efficiency and reduce emissions.

- Fuel economy standards for vehicles have the potential to be the most significant action to conserve energy in the transportation sector. Fuel economy standards for passenger cars have been frozen since 1985 and for light duty trucks since 1996. Generally, fuel economy, has worsened between 1990 and 2000.