



**New York City Outcomes and Recommendations  
For Greater Alternative Fuel Vehicle Use**

National Alternative Fuels Day and Environmental Summit  
Hostos Community College, Bronx, New York  
April 11, 2002

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## I. Overview

On April 11, 2002, more than 200 people attended the National Alternative Fuels Day and Environmental Summit at Hostos Community College in the Bronx, New York. The purpose of the Summit was to galvanize coordinated, community-based action to promote alternative fuel vehicle (AFV) programs and projects in New York City communities that bear a disproportionate share of the negative environmental consequences of vehicle emissions. AFVs can help improve air quality, protect public health, and reduce the environmental impact of transportation-related air pollution and reduce dependence on imported oil.

This “Outcomes Paper” outlines how community groups, businesses, government agencies and other non-governmental organizations can increase the use of AFVs in their communities and to build the partnerships necessary to affect change. This document includes perspectives of diverse experts, advocates and political leaders who contributed their time and effort to this process. Participating in this process were representatives from the New York City Department of Transportation Alternative Fuels Program, Sustainable South Bronx, Bronx Borough President's Office, Bronx Overall Economic Development Corporation, Manhattan Borough President's Office, West Harlem Environmental Action (WE ACT), office of Congressman Jose Serrano-16<sup>th</sup> Congressional District, United Puerto Rican Organization of Sunset Park (UpRose), U.S. Environmental Protection Agency, New York State Energy Research and Development Authority (NYSERDA), New York Power Authority (NYPA), and U.S. Department of Energy.

This process was facilitated by INFORM, Inc., an independent research organization that examines and reports on innovative business practices and technologies that can ensure environmentally sustainable economic growth.

## II. Background

There is a virtual asthma epidemic in the U.S., where asthma kills at least 5,000 Americans annually. Asthma is an especially acute problem in New York City, where asthma hospitalization rates are high (with an average of over 6.4 hospitalizations per 1000 residents), particularly in low-income communities. Between 1988 and 1997, asthma hospitalization rates in New York City increased by 22 percent, with the largest increases seen in children from low-income communities. For example, the South Bronx, which is comprised of predominantly low-income and communities of color, experienced a 100% increase in asthma hospitalization rates for children aged 0-14 from 8.3 (2,424) to 16.6 (4,934) per 1,000 persons between 1988 and 1997<sup>1</sup>.

More and more studies point to tail pipe emissions as a significant cause of the asthma problem in our nation's urban areas. According to recent studies by the American Medical Association,<sup>2</sup> Environment &

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<sup>1</sup> New York City Department of Health, 2000 (<http://www.asthma-nyc.org/publications/uhf.html>). For more information about childhood asthma rates in New York City, see [www.nyclink.org/html/doh/pdf/asthma/facts.pdf](http://www.nyclink.org/html/doh/pdf/asthma/facts.pdf) or contact the NYC Childhood Asthma Initiative, 1-877-ASTHMA-0 or 1-877-278-4620.

<sup>2</sup> Lung Cancer, Cardiopulmonary Mortality, and Long-Term Exposure to Fine Particulate Air Pollution, JAMA, March 6, 2002, Volume 287, No. 9

Human Health, Inc.,<sup>3</sup> the Union of Concerned Scientists,<sup>4</sup> airborne pollutants generated by diesel powered vehicles cause reduced lung function, lung damage, increased asthma attacks, and premature mortality. These studies also point out that alternative fuel vehicles can play an important role in reducing air pollution in urban areas throughout the U.S.

In 1999 the U.S. Department of Energy, a member of the White House Interagency Task Force on Environmental Justice in New York City, was asked to lead the efforts of the federal government and community representatives in organizing an alternative fuels summit, focusing on the acceleration of cleaner fuel vehicles that operate in neighborhoods affected by significant concentrations of diesel burning vehicular traffic. Over the past three years, more than 30 community-based organizations, fleet owners, academic institutions, industry, and city, state, and federal agencies in New York City have worked collaboratively to learn more about how alternative fuel vehicles can play an important role in reducing air pollution in their communities. These partnerships have resulted in community/government-sponsored alternative fuel forums in the Bronx (June 2000), Northern Manhattan (May 2001), and Southwest Brooklyn (July 2001), and the implementation of fleet conversions and community-fleet collaborative pilot projects. These efforts culminated in the National Alternative Fuels Day and Environmental Summit on April 11, 2002.

In preparation for the event, three key community groups and other alternative fuels advocates worked together to develop a set of proposed Outcomes & Recommendations regarding the use of alternative fuel vehicles within in New York City. The recommendations were introduced at the National Alternative Fuels Day & Environmental Summit and are included in this "Outcomes Paper." This document is intended to help guide community groups, fleet operators, and transportation planners implement economically, sustainable AFV programs in their communities.

### **III. Clean Transportation Goals for New York City**

To help improve air quality and protect public health in environmentally and economically distressed areas, community groups, fleet operators, transportation planners should implement alternative and clean fuel programs as a way to mitigate the impacts of air pollution in New York City communities. The following goals have been developed to guide these groups as they embark on the implementation of AFV programs.

**GOAL 1: Mobilize collective action towards the increased use of alternative fuels, cleaner conventional fuels, and advanced vehicle technologies.**

**GOAL 2: Strategically work to improve air quality, protect public health, and reduce dependence on foreign sources of oil by converting conventionally fueled fleets to the best available alternative or cleaner fuel.**

**GOAL 3:: Develop and implement near-term actions to achieve these goals within New York City communities that suffer the greatest transportation air quality burden as a vital first step toward reducing overall air pollution throughout the greater New York Metropolitan Area.**

**GOAL 4: Generate economic development opportunities through the increased use of advanced transportation technologies and the growth of related industries.**

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<sup>3</sup> Children's Exposure to Diesel Exhaust on School Buses, Environment & Human Health, Inc, 2002

<sup>4</sup> Pollution Report Card Grading America's School Bus Fleet, Union of Concerned Scientists, February 2002

#### **IV. Developing a Community-based AFV Strategy**

To implement the goals outlined above, communities should implement AFV projects that maximize air quality and health benefits, will attract private investment, will be operationally sound, and will help effectively deploy limited resources for environmental and air quality programs. The following questions should be asked when putting together AFV programs:

*What communities are the priority areas?*

Communities with above average asthma rates and rates of hospitalization due to asthma attacks should be high priority areas, with the ultimate goal being citywide progress toward alternative fuels and cleaner air.

*What fuels will help achieve these goals?*

“Alternative” fuels, which include domestically produced fuels other than gasoline or diesel, offer the greatest environmental, energy security, and human health benefits among the fuel options available today. Cleaner diesel and gasoline fuels, especially when combined with advanced vehicle technologies, can provide short term environmental benefits and are often a cost-effective interim strategy towards the eventual movement away from petroleum-based fuels.

*What fleets will help achieve these goals?*

Alternative fuel fleet conversion in proven “niche” markets, such as heavy duty transit buses, garbage trucks, delivery trucks, school buses, government fleets, and taxis/shuttles should be the priority over the long term. The development of alternative refueling infrastructure goes hand in hand with vehicle conversion. While alternative fuel infrastructure is being developed and funding to cover the incremental cost of new alternative fuel vehicles is actively pursued, cleaner diesel fuels and advanced vehicle technologies should be encouraged for those fleet applications in which proven emission benefits can be readily achieved in the short term at much lower costs.

*What partnerships are needed to expand the use of AFVs most effectively?*

The collaboration of various partners, including fuel providers/station developers; vehicle and engine providers; vehicle operators/fleets; government funding agencies, regulators, and policy makers; community groups and community development corporations; and City, State, regional and local economic development agencies are all needed in the development of AFV projects. Project success stories from around the country show that, without effective public/partnerships, AFV projects rarely succeed.

*What public policies are needed to affect change?*

Currently, the primary barrier to the widespread implementation of alternative fuel vehicles is cost. Alternative fuel vehicles usually cost more to buy than conventional vehicles, and refueling infrastructure and garage modifications also bring additional costs to alternative fuel projects. From a public health and public policy perspective, however, these added costs are justified due to the environmental and health benefits that alternative fuel vehicles provide. Therefore, policies are needed to ensure that alternative fuels are economically competitive with conventional fuels.

## **A. New York City's High Priority Areas**

The Environmental Justice (EJ) movement is based on the principle that no group of people should bear a disproportionate share of the negative environmental consequences resulting from the operations or the execution of federal, state, and local programs and policies. Therefore, when considering where alternative fuel programs should be implemented within a community, a community should first assess what areas in its community are disproportionately affected by air pollution. Communities with above average asthma rates and rates of hospitalization due to asthma attacks should be high priority areas, with the ultimate goal being citywide progress toward alternative fuels and cleaner air.

In New York City, the EJ movement's interest in local alternative fuels progress is inspired by the fact that many of New York's minority and low income residents suffer high asthma rates and other health problems associated with pollution generated by the regional transportation system, particularly the diesel-powered trucks, buses, and other vehicles operating in urban areas. The New York City Department of Health keeps statistics on the number of asthma hospitalizations per thousand city residents. When this data is overlaid on a census tract map, one can identify those communities that bear the biggest burden of the air pollution problem. In New York City, twelve communities have been identified as high priority areas because of their higher than average asthma hospitalization rates for children aged 0-14.<sup>5</sup> The City-wide average is 6.4 hospitalizations per 1000 residents.

*Asthma Hospitalization Rates (Year 2000)  
for Children aged 0-14, per 1000 population\**

<b>High Priority Neighborhood</b>	<b>Asthma Hospitalization Rates for Children aged 0-14, per 1000 population</b>
East Harlem (Manhattan)	17.02
High Bridge – Morrisania – Port Morris (Bronx)	11.67
Central Harlem – Morningside Heights (Manhattan)	10.59
Pelham – Throgs Neck (Bronx)	10.52
Hunts Point – Mott Haven (Bronx)	10.36
Fordham – Bronx Park (Bronx)	9.92
Bedford Stuyvesant – Crown Heights (Brooklyn)	9.17
East New York (Brooklyn)	8.71
Crotona – Tremont (Bronx)	8.52
Rockaway (Queens)	8.4
Northeast Bronx (Bronx)	7.71
Jamaica (Queens)	7.65

\* *New York City Department of Health*

## **B. The Benefits of Alternative and Cleaner Conventional Fuels**

Alternative fuels, including any fuel other than gasoline or diesel, offer the greatest environmental, energy security, and human health benefits among the fuel options available today. Cleaner diesel and gasoline fuels, especially when combined with advanced vehicle technologies, provide short term environmental benefits and are often a cost-effective interim strategy towards the eventual movement away from oil-derived fuels.

<sup>5</sup> New York City Department of Health, 2000 (<http://www.asthma-nyc.org/publications/uhf.html>). For more information about childhood asthma rates in New York City, see [www.nyclink.org/html/doh/pdf/asthma/facts.pdf](http://www.nyclink.org/html/doh/pdf/asthma/facts.pdf) or contact the NYC Childhood Asthma Initiative, 1-877-ASTHMA-0 or 1-877-278-4620.

## Alternative Fuels

The use of domestic alternative fuels that are cleaner than conventional gasoline and diesel can mean important progress in making New York City's air healthier to breathe and in reducing New York's exceptionally high reliance on foreign oil. According to the New York State Energy Research and Development Authority, New Yorkers spent approximately \$12.6 billion dollars on energy related to the transportation sector in 1999. Eighty-five percent of the oil used in this state is imported, (*New York State Energy Fast Facts*, NYSERDA, 2000) a level of reliance greater than that of any other state in the country.

The alternative transportation fuel most widely used in the New York metro area is compressed natural gas (CNG). CNG is clean burning and produces significantly fewer harmful emissions than gasoline or diesel fuel. Natural Gas vehicles help reduce smog-forming nitrous oxides and particulate matter. This fuel is also virtually free of toxic constituents. Natural gas is also viewed as an important transition fuel on the path to use of hydrogen in fuel cell vehicles, because natural gas is the preferred feedstock for producing economically-viable hydrogen today and because much of the CNG refueling infrastructure could be modified for use with hydrogen fuel in the future. While natural gas is by far the predominant alternative fuel in the New York area, there is also some use of electricity and ethanol. The fact that natural gas, ethanol and electricity are all domestically produced, and that their use takes the place of oil, is especially important to energy security in New York State.

## Cleaner Conventional Fuels and Hybrid Technologies

Instead of turning to alternative fuels, some fleets have looked to the use of cleaner conventional fuels or hybrid technologies as a way to achieve emission reductions from their vehicle operations. Vehicles operating on a cleaner fuel (such as ultra low sulfur diesel, or ULSD; oxygenated diesel; and reformulated diesel) and hybrid electric vehicles (powered by a combination of gasoline or diesel and electricity) that use conventional gasoline or diesel fuel as a primary fuel source do not qualify as alternative fuel vehicles. These cleaner fuels and advanced vehicle technologies can play a role, however, in reducing emissions from vehicles in the short term while more permanent infrastructure for alternative fuel vehicles is developed. Especially promising are the new pairings of fuel-efficient hybrid electric technologies with alternative fuels that are currently being developed. These advanced vehicles represent a new level of progress toward the pollution-free hydrogen fuel cell.

### **C. Finding Success in "Niche" Market Fleets**

Successful programs from around the country have shown that AFVs work best in "niche" fleets where the operational characteristics and economics justify the investment in new vehicle technologies and fueling infrastructure. Typically, "niche" market fleets that operate numerous vehicles of a single type, travel predictable routes, are centrally refueled, and operate multiple shifts (using large quantities of fuel) can offer operational efficiencies all for the cost-effective implementation of alternative fuel technologies. Fleets that meet these criteria include heavy duty transit buses, garbage trucks, delivery trucks, school buses, government fleets, and taxis/shuttles. Such niche fleets are usually also important to environmental justice groups because they often are located in urban areas and can pose a significant threat to the health and environment of local residents. Therefore, alternative fuel fleet conversion in proven "niche" markets should be the priority over the long term. While alternative fuel infrastructure is being developed and funding to cover the incremental cost of new alternative fuel vehicles is actively pursued, cleaner diesel fuels and advanced vehicle technologies should be encouraged for those fleet applications in which proven emission benefits can be readily achieved in the short term and at much lower costs.

## Public Transit Buses

Over the past decade, concern has been growing among government, environmental, health, and community leaders about the price Americans are paying for our reliance on diesel-fueled municipal buses. Heavy-duty diesel buses and trucks are responsible for 25 percent of smog-forming pollutants and 58 percent of the particulate matter generated by highway traffic in the U.S. Municipal bus depots are often sited in minority and economically disadvantaged communities, causing these communities to suffer disproportionately from health-related impacts of diesel bus emissions. Concerns about the health impacts of municipal buses and bus depots on the health of distressed communities is particularly acute in New York City, where a nonprofit organization, West Harlem Environmental Action (WE ACT), filed a Title VI complaint in November 2000 with the U.S. Department of Transportation stating that New York's Metropolitan Transportation Authority (MTA) advances a discriminatory policy of disproportionately siting diesel bus depots and diesel bus parking lots in minority neighborhoods in Northern Manhattan. WE ACT has advocated that these facilities be converted to natural gas and that the MTA continue to use clean fuel buses and depots in Harlem and Washington Heights.

Today, more than ever before, public transit agencies are taking advantage of the ever growing availability of alternative fuel bus technologies. Of the buses running on US roads today, less than 10% are powered by natural gas. However, this is changing--about 25% of all new buses on order are natural gas, and a number of fleets report that 100% of their new bus purchases will be natural gas. Over 75 transit agencies have begun the shift from diesel to natural gas; some of these include Los Angeles, Sacramento, and Atlanta transit authorities; SunLine Transit Authority in Thousand Palms, California; and New York City's Department of Transportation. Assuming all potential orders are made, the percentage of natural gas buses in America's fleets will climb to 12.8% of the total by 2005. Electric transit buses also are used in some cities. Hybrid electric buses, including hybrid electric natural gas vehicles, are increasingly used to provide air quality benefits in cities across the nation.

Compressed natural gas buses currently cost about \$30,000 to \$50,000 more than conventional diesel buses. However, the cost difference is expected to decrease as the cost of conventional bus technologies equipped with oxidation catalysts and diesel particulate filters (as required by U.S. EPA in 2007) increases and the volume of CNG buses produced increases (bringing the capital costs down). Even when these added costs of the natural gas system are considered, transit buses can be an economical application of AFV technologies because of the lower cost of natural gas relative to diesel fuel and the savings realized from effective maintenance of buses burning a cleaner fuel.

Public transit agencies receiving federal and state funding may be required or encouraged to use cleaner and/or alternative fuels depending on the region's clean air status. For example, the Federal Transit Administration (FTA) provides funding for the acquisition and use of transit buses and the development and demonstration of alternative fuel bus technologies. The federal Clean Fuels Formula Grant Program provides funding for the purchase or lease of cleaner diesel buses and facilities and the improvement of existing facilities to accommodate cleaner diesel buses. In New York, the Clean-Fueled Bus Program, funded by the Clean Air/Clean Water Bond Act, provides funds to state and local transit agencies, municipalities, and schools for up to 100% of the incremental cost of new alternative-fuel buses and associated infrastructure.

MTA-New York City Transit currently operates a fleet of 4,489 buses. 221 of these are CNG buses, and 10 are hybrid electric. The remainder of the fleet (approximately 4,250 vehicles) is operating on ultra low sulfur diesel (ULSD), with conventional diesel having been phased out completely since September 2000. MTA-New York City Transit has installed diesel particulate filters (DPFs) on approximately 1,000 buses and has committed to install DPFs on the entire diesel fleet by the end of 2003. MTA-New York City Transit has also committed to retire all pre-1993 two-stroke diesel engines from the bus fleet by the end of 2003, and in order to meet that commitment has already "repowered" more than 300 buses with new



diesel engines equipped with exhaust gas recirculation and DPFs. MTA-New York City Transit currently has an additional 255 CNG buses and 325 hybrid electric buses on order, which will be delivered over the next two years. Beyond these buses on order, MTA-New York City Transit has committed to purchase an additional 50 hybrid electric buses and 170 CNG buses by 2005.

The New York City Department of Transportation also operates a fleet of CNG buses, which are operated by the City DOT franchise bus fleets, including Queens Surface (147 CNG buses), Command Bus (111 buses) and Triboro Coach (96 buses). Jamaica Bus and Green Bus have not yet been converted. Fueling stations are currently located at Queens Surface and at Triboro Coach, with facilities for NY Bus, Jamaica Bus and Green Bus in the design planning stages. The City DOT bus franchises cooperatively evaluated methanol buses with US EPA beginning in 1990. This served as a test fleet for both Detroit Diesel Corporation and US EPA. The first natural gas (CNG) buses entered service in 1991 and were conversions sponsored by the local gas utility. This experience led the City to acquire an additional 53 CNG and 12 methanol buses in 1994. In 1998-1999, 302 more CNG buses were purchased. The methanol bus program was later dropped as the engines and fuels were no longer being supported by the manufacturer. The City DOT has committed to purchasing only new CNG buses, and currently owns 354 CNG buses and plans to purchase approximately 350 additional CNG buses through 2005. The currently CNG fleet represents approximately 28% of the total DOT transit bus fleet.

#### Federal, State and Local Government Fleets

Many state and local governmental and federal agency fleets have incorporated AFVs into their fleet operations. In New York City, federal, state and local fleets are all required to use alternative fuel vehicles under various laws and regulations. The Energy Policy Act of 1992 (EPACT) mandates the use of alternative fuel vehicles by federal and state fleets. The purpose of this law was to reduce the nation's dependence on foreign oil while providing a "jump start" for the AFV market and its associated fueling infrastructure. Federal and state government agency fleets are covered by EPACT. The City also has its own AFV mandate – Local Law 6 – passed in 1991, which requires the aggressive purchase of alternative fuel vehicles by the City of New York. Since that time, the City of New York has administered a multi-agency program focused on the procurement of AFVs and the development of refueling infrastructure. The strategy to develop alternative fuels and AFV use in NYC has been jointly administered over the years by the City's Environmental Protection, Transportation and City Administrative Services agencies.

While Local Law 6 and EPACT mandate the purchase of alternative fuel vehicles, they do not mandate that these vehicles actually use alternative fuels. Therefore, government agencies can meet these legal requirements by purchasing bi-fuel or flex fuel vehicles, which are built to burn either conventional or alternative fuels, and run these vehicles primarily or solely on conventional fuels. Such practices do little or nothing to "jump start" alternative fuels markets. The public sector should reexamine its own commitment to meeting the intent of existing AFV purchase mandates by committing to use alternative fuels in their vehicles wherever possible. This will both ensure that the environmental benefits of the fuel are realized and help create a demand for public access fueling infrastructure. If they do not do so voluntarily, they may be mandated to do so due to pending legal challenges. For example, the US DOE recently reported<sup>6</sup> that Earthjustice, a nonprofit law firm founded in 1971 as Sierra Club Legal Defense Fund, is suing the federal government for failing to meet the fuel displacement goals outlined by EPACT. The suit argues that the federal government should work aggressively to meet its own mandates by burning alternative fuels in its bi-fuel vehicles and by purchasing more efficient dedicated AFVs in the future. These practices should be encouraged for all government fleets. Additional infrastructure will also be needed to support these efforts. Typically, with a multi-year fuel usage agreement in hand, a private fueling developer can install and operate a fueling station economically. Therefore, public entities may

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<sup>6</sup> David Rodgers, presentation to the National Clean Cities Day, Washington DC, March 12, 2002.

have to explore entering into multi-year fuel purchase and vehicle purchase contracts in order to attract a private investment in public access stations over the long term.

The federal government has reported that it operates approximately 640 light duty CNG vehicles and 300 ethanol vehicles within the City of New York. (Also, see section on Delivery Fleets operated by United States Postal Service.)

The State of New York has an aggressive plan to make 100% of its fleet capable of operating on alternative fuels by 2010 and currently operates approximately 550 AFVs in the City of New York. To help them achieve their AFV purchase goals, the State of New York is in the process of developing 16 public access and over 40 limited access CNG fueling stations throughout the state.

The City of New York has been purchasing AFVs since the early 1990s. The City light duty AFV program began with the conversion of 385 municipal fleet vehicles to CNG in the 1993-1994. The City gradually shifted its policy to only accept natural gas vehicles certified and manufactured by the automotive manufacturers themselves as a way to assure that reliability and emissions benefits were achieved. In New York City agency fleets, 2300 out of a total of 25,000 light duty vehicles are equipped to run on clean fuels (2001). Most of the city's AFVs are bi-fuel vehicles capable of refueling on either gasoline or compressed natural gas. The City of New York has also been involved with the introduction and development of electric vehicles (EVs) for the past ten years. The City operates one of the largest municipal EV fleets in the country with over 70 EVs in operation in the municipal fleet.

Under an agreement, the City of New York's Department of Transportation is in the process of developing seven (7) CNG fueling stations as a part of a Consent Decree with the U.S. EPA and the U.S. Department of Justice. Funding provided by the City of New York will be used to develop one large CNG fueling facility for the Department of Sanitation compactor trucks, three medium-sized CNG fueling stations at City facilities (DOT and DEP) that will be used by city agency fleets, and three stations at public facilities in the Bronx, lower Manhattan and Brooklyn that will be used by private fleets and taxis. The City-owned stations are currently moving forward with the installation process. The City is in the process of determining how to move forward with the public access station projects. One barrier to the implementation of this program is that fuel commitments have not yet been secured for the public access sites. The private fuel providers have expressed their unwillingness to support the development of public access fueling stations in the region if fuel usage commitments are not secured.

#### Taxis and Livery Cabs

Nationwide, while over 60,000 taxis and liveries may be in operation (1992 Census of Transportation), nowhere are taxis more visible than in New York City. In the early 1990s, concern grew over the contribution that taxis and liveries made to the City's air pollution problem. At the time, the City of New York estimated that the 12,000 yellow taxis on the road in 1998 accounted for more than one-third of all the miles driven in Manhattan south of 96<sup>th</sup> Street, and one-third of the City's motor vehicle emissions. These estimates did not even include the thousands of livery vehicles also in operation throughout the City.

Throughout the country, most taxi fleets share a common vehicle type, and as a result, the automotive industry and the natural gas industry worked together to develop a dedicated natural gas taxi specifically targeted to the taxicab market. By operating a natural gas vehicle, taxi operators could benefit from the cleaner engines and the potential cost savings, which accumulates for taxi operators which may travel in excess of tens of thousands of miles per year. Today, a natural gas taxi has an incremental cost in the range of \$9,800, which can be reduced significantly with manufacturer rebates and government funding programs specifically targeting taxi fleet conversions.

In the mid 1990s the City of New York, working with a group of project partners including the Taxi and Limousine Commission, Ford, Con Edison, and KeySpan Energy, implemented a natural gas taxi program in the City of New York, with some success. The purpose of the program was to capture the large potential environmental and energy consumption benefits of alternative fuel taxis in New York City by providing incentives for the purchase of natural gas taxis by regulated taxi fleets. The medallion taxi fleet is currently comprised of approximately 12,000 taxis; each of these taxis travels an average of average 50,000-80,000 miles per year and consumes approximately 15 gallons of fuel per day (close to 5,000 gallons per vehicle per year). Key elements of the incentive program included grant funds provided by the City of New York Department of Transportation and other incentives enacted by the Taxi and Limousine Commission for the operation of natural gas taxis. Approximately 300 natural gas taxis were purchased with the available funding and are now in service. Recently, however, few new natural gas taxis have been placed into service in New York due to the trunk capacity and range of the vehicles as well as limited natural gas refueling infrastructure available to support the taxi fleet. This program continues to evolve today as the NYC DOT works in conjunction with Ford to improve the trunk capacity and range of the vehicles as well as expand the infrastructure necessary to support the taxi fleet.

If this program is to continue, fleets and station providers must work together to make commitments towards the purchase of clean fuel taxis in coordination with the development of refueling infrastructure. The relevant City agencies can help encourage them to do so by continuing to provide funding for vehicle purchases and infrastructure development, continuing the existing natural gas vehicle retirement incentives, and establishing vehicle resale programs at the end of the useful life of natural gas taxis. In addition to these incentives, alternative fuel tax incentives could also help make alternative fuels more attractive relative to conventional fuels. State and local fuel taxes in New York State amount to approximately 37 cents per gasoline-gallon equivalent. A reduction of the taxes on alternative fuels could help both the fleet operator and the station developer by creating a significant cost differential between CNG and gasoline.

Over the coming years, the 300 natural gas taxis now in service must be retired under rules created by the Taxi and Limousine Commission. The City of New York has expressed interest in developing a resale or reuse program that would keep the vehicles operating within the City of New York. One option would be to set up a pilot program to place the retired natural gas taxis into service as livery vehicles. This should be explored.

### Private Delivery Vehicles

In 2000, there were over 7.0 million medium and heavy duty trucks registered (trucks with a gross vehicle weight over 26,000 pounds) in the U.S. (Heavy Duty Distribution Association). According to the industry estimates, there are over 190,000 medium and heavy duty trucks operating in the New York metro area.<sup>7</sup> While heavy-duty trucks are essential to our commerce and to our quality of life, these high-mileage, high-fuel-use vehicles emit particulate matter, nitrogen oxide, and other greenhouse gas precursors at levels much higher than the emissions levels of light-duty vehicles. Heavy-duty fleets that sit idling also expend fuel and steadily release harmful emissions into the air.

Heavy duty trucks have been the target of recent regulations enacted by the U.S.EPA which seek to reduce the emissions generated by the nation's medium and heavy duty vehicles. According to U.S. EPA, the new standards will require gasoline trucks to be 78 percent cleaner and diesel trucks to be more than 40 percent cleaner than today's models. In addition, the EPA is also requiring the use of cleaner diesel fuels (low sulfur diesel) that will reduce air pollution from trucks by another 90 percent by 2007. Fleets that operate along fixed routes or routes with limited range make them excellent candidates for natural gas or electric delivery vehicles. In some parts of the country, LNG (liquefied natural gas) is becoming a

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<sup>7</sup> Ward's Automotive Yearbook, 1998

popular fuel choice for heavy duty trucks. LNG is preferred by some fleets over CNG because it allows more fuel to be stored on board with less weight, allowing more vehicle range and operating time with the same (or better) emission benefits. LNG has not been used in New York State due to a state-wide moratorium on the siting of LNG fueling facilities, which has prevented the development of LNG fueling facilities. While this moratorium has expired for areas outside of New York City, there has been a lack of movement to develop the LNG market in New York. If the state begins to allow the development of LNG facilities, medium and heavy duty fleet operators will have another alternative fuel choice, which could lead to the further deployment of LNG heavy duty vehicles in New York City as well.

The City of New York Department of Transportation, in partnership with NYSERDA, has made funding available through the Private Fleet Program to reduce the out-of-pocket costs associated with purchases of alternative fuel delivery trucks. This program complements existing state and federal tax credits and provides grant funding to offset the incremental cost associated with vehicle acquisition.

One fleet located in the South Bronx that took advantage of this funding opportunity is Manhattan Beer Distributors. Manhattan Beer Distributors, a locally owned and operated distributor of Coors, Corona and other beverages, operates a fleet of over 500 vehicles from its South Bronx/Port Morris distribution facility. In February 2002, Manhattan Beer celebrated the roll-out of the first of its heavy duty beverage delivery trucks that will operate exclusively on CNG. Over \$600,000 in CMAQ funding was allocated to this project in addition to approximately \$95,000 provided by the United States Department of Energy. Manhattan Beer's delivery trucks average about 60 miles per day in the New York City Metropolitan Area. Each vehicle, repowered from diesel to dedicated CNG, will displace about 3,000 gallons of diesel fuel each year for the next 12 years, or 540,000 gallons of diesel fuel over the lives of the 15 delivery trucks. The natural gas engines will save approximately 177 tons of emissions over their operating lives.

The United States Postal Service (USPS) is also using alternative fuels in their NYC delivery vehicle fleet, with 22 electric two-ton delivery trucks in service in Manhattan. Sponsors of this project include the Northeast Advanced Vehicle Consortium, which provided funding for the initial development of two vehicles, NYCDOT, and the New York Power Authority (NYPA), which oversaw the initial demonstration and provided co-funding for the procurement of 20 additional vehicles. These delivery trucks have a 40 mile range. Because NYC delivery workers travel more miles by elevator than truck within the city, these USPS delivery vehicles travel an average of only 7 miles/day. The limited range and low daily mileage of these vehicles makes electricity a good alternative power source.

Opportunities to reduce emissions in heavily industrialized areas also exist for vehicles that cover neither fixed routes nor short distances. Last winter, the Hunts Point Cooperative Market, in partnership with Sustainable South Bronx, the New York Power Authority, and the Idle Aire Corporation, began the installation of electrification units at truck parking spaces within the Hunts Point Cooperative Market, the largest food distribution center in the world. Drivers of long-haul tractor trailers currently keep their truck and refrigerated trailer engines running for hours at a time while they rest or wait to unload at the Market. The electrification devices allow drivers to operate cab climate control systems, appliances, and refrigerated trailers without idling engines. Two truck bay electrification units were installed during the summer of 2001, with another twenty-six scheduled to be in operation by May of 2002. At full operation, the 28 bays are expected to eliminate over 15 tons of nitrous oxides, 2,000 tons of carbon dioxide and nearly a ton of toxic particulates. The truck bay electrification units are ideal for large distribution centers that generate high volumes of diesel truck traffic. The project was funded using a \$400,000 grant from the Clean Air Communities fund.

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<sup>8</sup> Ward's Automotive Yearbook, 1998

### Garbage Trucks

Although garbage trucks do not constitute a major share of the vehicles on America's roads (only 0.06 percent), the average garbage truck logs twice as many miles a year as the typical single-unit heavy duty truck and nearly three times as the average bus. Except for tractor trailers, garbage trucks are estimated to use more fuel annually than all other vehicles because they travel more miles and get extremely low fuel economy – (approximately 3-3.5 miles per gallon) due to their unfavorable operating conditions, which include frequent starts and stops and energy-intensive compaction cycles that condense the contents of the truck.

Garbage trucks present themselves as excellent candidates for alternative fuel conversions. As high fuel use vehicles, garbage trucks offer the potential for significant air quality, public health, and energy benefits for the communities in which they operate. The operating characteristics of many garbage trucks are well-suited to alternative fuels, with 61 percent traveling under 200 miles per trip and refueling at a central station (either company owned on-site or privately held off-site). Fifty-eight (58) percent of garbage trucks travel under 100 miles and are centrally refueled.

The New York City Department of Sanitation (DOS) currently operates a fleet of 2,566 garbage trucks, which includes approximately 2,066 refuse collection vehicles (the remaining trucks collect recyclables). The New York City Department of Sanitation (DOS) fleet was an alternative fuel pioneer among garbage truck fleets, receiving its CNG prototype in 1989 and acquiring 16 additional CNG refuse collection vehicles by 1996. Today, DOS operates a fleet of 25 CNG garbage trucks in addition to operating a light duty fleet of 425 CNG vehicles and 166 ethanol vehicles. The CNG vehicles are currently refueled at public-access CNG stations throughout New York City, but the Department of Sanitation is in the process of developing a CNG fueling station for its fleet in Woodside, Queens, which is scheduled for completion by the end of 2002.

The experience of the Department of Sanitation with its CNG fleet has been largely positive. CNG technology was originally challenging, but has been refined considerably with each new generation of vehicles since 1996. DOS has become increasingly comfortable with the operation and maintenance of their CNG vehicles. DOS is also in the process of implementing a program with certain engine manufacturers to retrofit trucks with diesel particulate filters and convert the trucks to ultra low sulfur diesel. The biggest obstacle to further acquisition of alternative fuel vehicles by DOS is the higher capital cost. According to the Department of Sanitation, the average cost of a new diesel garbage truck is \$135,000. The incremental capital cost of a new CNG garbage truck is about \$65,000-\$70,000.

In addition to the DOS, Waste Management was recently awarded funds from a NYCDOT and NYSERDA grant program to implement a CNG garbage truck program in New York City. Waste Management has implemented successful CNG and LNG garbage truck projects in California and Texas.

### School Buses

School bus operations have been a target for alternative fuel use, primarily due to the potential health risk posed by diesel fuel on school children. Recent studies by the Union of Concerned Scientists and Environment & Human Health, Inc. have called attention to the significant health risks caused by diesel school buses on our nation's school children. By breathing in diesel exhaust, children are more susceptible to a variety of illnesses, such as asthma and reduced lung capacity. Both the EPA and the State of California have classified diesel fuel, containing 40 known air toxics, as a "likely" carcinogen. School boards are often reluctant to switch to alternative fuel school buses due to safety concerns; high capital costs of the vehicle, which may include a \$25,000 to \$50,000 incremental cost; fueling station costs; and garage upgrades.

There are approximately 5,000 school buses in operation in New York City, and over 450,000 school buses nationwide (Union of Concerned Scientists). The vast majority of these buses operate on diesel

fuel. However, some alternative fuel vehicles and cleaner fuels are beginning to make their way into New York City school bus fleets. The New York Power Authority (NYPA) has two electric buses in service with Atlantic Express in Jamaica, Queens. The buses are manufactured by Blue Bird Body Company and Solectria Corporation and have a sixty-mile range, sufficient range to meet the New York City Board of Education duty cycle requirements for most daily trips. The first bus was put in service in January 2001. The second bus was put into service early this year. Atlantic Express is extremely pleased with the performance of the buses and will be partnering with NYPA in the demonstration of a hybrid-electric school bus later this year.

NYPA is also in the process of implementing a program to test the emissions benefits associated with the use of ultra low sulfur diesel (ULSD) fuel in combination with diesel particulate filters and diesel oxidation catalysts. Six million dollars has been committed to convert 1,000 buses to ULSD and equip them with these emission-control devices. A recent study completed by the New York State Department of Environmental Conservation (DEC) on the use of ULSD in the MTA-New York City Transit buses equipped with continuously regenerating diesel particulate filter systems shows a 90% reduction in CO and HC and a 90% reduction in PM with the particulate filter. The NYPA pilot project is seeking to determine whether school bus applications can achieve similar emission benefits. Project partners include New York State DEC and Atlantic Express.

Elsewhere across the country, selected school districts, such as the Lower Merion School District in Pennsylvania, have implemented comprehensive natural gas school bus programs. The Union of Concerned Scientists recently reported that school districts in at least 19 states have used alternative fuel buses.

#### ***D. AFV Partnership Opportunities***

The collaboration of various partners, including fuel providers/station developers; vehicle and engine providers; vehicle operators/fleets; government funding agencies, regulators, and policy makers; community groups, community development corporations, and Environmental Justice groups; and City, State, regional and local economic development agencies are all needed in the development of AFV projects. Project success stories from around the country show that, without effective public/partnerships, AFV projects rarely succeed.

Key partners in successful efforts should include:

- ?? Fuel Providers/Station Developers who provide the fueling infrastructure and fuel. Today, there are limited players in the marketplace; however, the interest in the market is growing. Fueling stations can be set up as either private access (with limited access) or public access.
- ?? Vehicle and engine providers who provide the equipment capable of operating on the alternative or clean fuel. Vehicles may be available for purchase through local dealerships or through certified conversion or repower shops.
- ?? Vehicle operators that use the vehicles are critical. Without the commitment of vehicle operators, the benefits of cleaner fuels cannot be realized. Vehicle operators can be either government or private fleet operators.
- ?? Government funding agencies, regulators, and policy makers that provide the foundation for many of these programs. For example, government funding is available to offset the incremental

cost of vehicle acquisition, vehicle conversions/repowers, or station installation. Funding is typically not available for the costs of fuel.

- ?? Community Groups and Community Development Corporations who help identify opportunities for change, convey the concerns of their communities and their support for alternative fuel vehicles to decision makers, and help develop the partnerships necessary for change.
- ?? City, State, Regional and local economic development agencies that are key players in New York State Empire Zones and U.S. Empowerment Zones who help facilitate connections between companies interested in converting to alternative fuels and government programs that support these conversions. Businesses should work with these agencies to further the commercialization and profitability of the alternative fuels industry.

### ***E. Using Public Policy to Affect Change***

Currently, the primary barrier to the widespread implementation of alternative fuel vehicles is cost. Alternative fuel vehicles usually cost more to buy than conventional vehicles, and refueling infrastructure and garage modifications also bring additional costs to alternative fuel projects. From a public health and public policy perspective, however, these added costs are justified due to the environmental and health benefits that alternative fuel vehicles provide. The full costs of environmental damage and treatment for respiratory and other health conditions induced or triggered by air pollution -- especially childhood asthma -- run into the tens of millions of dollars but are hard to precisely quantify. Therefore, the following public policies are urgently needed to ensure that the pace of alternative fuel vehicle use programs is accelerated.

#### Incentives for AFV Acquisition and Refueling Infrastructure

Since perhaps the primary barrier to the switch to cleaner transportation technologies is the increased cost relative to the conventional technologies, public policies aimed at creating a level economic playing field are most important. Increased costs may come in the form of incremental costs of vehicle acquisition or retrofit, refueling infrastructure, operating costs, maintenance costs, and training. Incentives and funding for implementation of clean fuel and alternative fuel programs can level the playing field for clean versus conventional technologies. In addition to direct monetary incentives, such as those that support the research and development of new technologies, other incentives such as HOV lane access and “green parking” privileges can also help encourage the increased use of AFVs. Some of the existing incentives include:

- ?? Existing Grant Funding
  - Clean Air Communities grants for heavy duty diesel conversions/retrofits
  - New York City CMAQ funds for private fleet vehicle acquisition
  - New York City CMAQ funds for taxi acquisition
  - USDOE Clean Cities Projects, including vehicle acquisition and refueling station development
  - New York State Clean-Fueled Bus Program, funded by the Clean Air/Clean Water Bond Act, for state and local transit agencies, municipalities, and schools; this program covers up to 100% of the incremental cost of new alternative-fuel buses, and associated infrastructure.
- ?? Existing Tax Credits
  - NYS 60% tax credit for AFV acquisition
  - NYS 50% tax credit for AFV refueling infrastructure
  - Federal tax deduction for AFV purchase and refueling station development

### New Policy Opportunities

In addition to these existing programs, more work is needed to help encourage the use of AFVs by both government and private fleet operators. Some areas of opportunity are outlined below.

- ?? New funding programs. Other states, such as California (Carl Moyer program) and Texas (SB 5), have funds that are dedicated to supporting the conversion of heavy duty vehicles to alternative fuels. New York should look at adopting a similar program to help private fleets convert to alternative fuels.
- ?? Extension of NYS tax credits. The current slate of tax incentives in New York State is scheduled to expire in 2003. New York State should commit to supporting the extension of these incentives through at least 2008.
- ?? Fuel tax incentives for alternative fuels. Alternative fuels and conventional fuels are currently taxed at the same rate by the State and City of New York. The reduction of city and state taxes on alternative fuels could help create a significant cost differential between the cost of conventional and alternative fuels and should be explored further.
- ?? Non-monetary incentives. Incentives such as Green Parking and HOV restriction exemption for AFVs can also help encourage the use of AFVs and should be explored.
- ?? Empowerment Zone funding/incentives. The creation of tax incentives specifically targeted to environmentally distressed communities could help stimulate the development of AFV programs in these areas.
- ?? New regulations that allow development of LNG refueling facilities. The LNG vehicle market will not develop until regulations permitting the development of LNG fueling facilities are implemented. The development of these regulations will offer fleets the additional option of LNG alternative fuel vehicles. LNG has particularly promising applications for heavy duty delivery and garbage trucks, as well as for articulated buses.
- ?? Include mobile source review in EIS for stationary facilities. The state should include mobile source emission review in all environmental impact studies of stationary facilities.
- ?? Moratorium on permits for new facilities using diesel-fueled trucks and buses. The state should explore the implementation of additional control mechanisms for mobile sources, such as the moratorium on the issuance of permits for facilities in high asthma neighborhoods that rely on diesel-fueled trucks and buses.
- ?? Require alternative fuel usage by government fleets. Government fleets operating in New York City should look at ways to ensure that its alternative fuel vehicle fleet is using alternative fuels, such as by phasing out the purchase of bi-fuel vehicles or requiring and monitoring the purchase of alternative fuels by government agencies
- ?? Join the Clean Cities Program. New York City should join the U.S. Department of Energy's Clean Cities Program to take advantage of grant programs and other services.



## V. Clean Transportation Recommendations

**Recommendation #1:** Devote significant resources to offset the costs of implementing AFV projects, such as the incremental cost of vehicle acquisition and fueling station development. Those resources should be focused on those communities that are most impacted by the region's failure to meet clean air act attainment as measured by health effects, using Department of Health list of communities most impacted by asthma as a starting point.

**Recommendation #2:** Prioritize the conversion of heavy duty diesel vehicles to alternative fuels in proven "niche" markets, such as heavy duty transit buses, garbage trucks, and school buses, over the long term. The use of alternative fuel vehicles by government fleets, and high fuel use fleets such as taxis and liveries, should also be a priority. The development of alternative refueling infrastructure should go hand in hand with vehicle conversion.

**Recommendation #3:** Encourage the use of cleaner diesel fuels and advanced vehicle technologies for vehicle applications in which proven emission benefits can be readily achieved in the short term while alternative fuel infrastructure is being developed and while funding to cover the incremental cost of new alternative fuel vehicles is pursued.

**Recommendation #4:** Encourage local, state and federal agencies to mandate the use of alternative fuels in their bi-fuel AFVs, and work with both government and private fleets to aggregate fuel usage in order to attract private investment in refueling infrastructure. Local, state and federal agencies should also be encouraged to deploy as many vehicles as possible operating alternative fuels or the cleanest non-alternative fuels in the high priority areas.

**Recommendation #5:** Develop public/private partnerships necessary to increase the use of alternative fuel vehicles in private markets, such as the New York City livery fleets, that cause an environmental burden in high priority areas. Public private partnerships may include the development of a pilot program to place the retired natural gas taxis into service as livery vehicles in EJ Communities, and the development of public access refueling infrastructure to support vehicle deployment.

**Recommendation #6:** Educate fleet operators and private station developers about the existing funding mechanisms, such as grant funding, tax credits, and tax deductions that help reduce the costs of AFV programs.

**Recommendation #7:** Address AFV purchasing rules prohibiting multi-year purchasing contracts by government fleets that, if adjusted, could help support development of public access CNG infrastructure.

**Recommendation #8:** Support advocacy efforts aimed at encouraging MTA-New York City Transit to continue and expand its CNG program. Efforts include encouraging the conversion of the 100<sup>th</sup> Street and Mother Hale Depots to CNG, ensuring that all new transit bus depots in New York City will be CNG, supporting deployment of alternative fuel transit buses by the MTA's NYC Transit throughout NY City, supporting conversion of existing diesel depots to CNG.

**Recommendation #9:** Support development of policies and regulations by the State of New York Department of Environmental Conservation and the City of New York that support the siting of new liquefied natural gas (LNG) fueling facilities and the transport of LNG throughout the state.

**Recommendation #10:** Support the creation of new monetary incentives, such as new grant programs for AFV acquisition and fueling station development, extension of the NYS AFV tax incentives, fuel tax incentives for alternative fuels, and property tax incentives that help encourage the use of AFVs in high priority areas.

**Recommendation #11:** Include mobile source emissions in all Environmental Impact Studies of stationary facilities.

**Recommendation #12:** Place a moratorium on the issuance of permits for facilities in high asthma neighborhoods that rely on diesel-fueled trucks and buses.

**Recommendation #13:** Support the City of New York in joining the national Clean Cities program.

**Recommendation #14:** Seek funding or other resources to support consistent and organized action in support of AFV programs and for training and education.

**Recommendation #15:** Establish AFV Working Groups in distressed communities that will promote and plan the implementation of AFV projects and monitor the public policy recommendations outlined above.

**Recommendation #16:** Identify and secure fleet commitments that can support public and private access fueling infrastructure development in New York City, and develop Public/Private Partnerships necessary to address the lack of a public access CNG fueling network.

**Recommendation #17:** Hold follow up workshops on specific areas of interests, such as informing unions and economic development agencies, about specific training requirements and OSHA requirements.

**Recommendation #18:** Encourage government agencies to include these recommendations in their long range plans, such as the state and federal energy plans.

## **VI. List of Supplemental Summit Packet Materials**

- ?? Opportunities for Public Transit Fleets
- ?? Opportunities for Garbage Truck Fleets
- ?? Opportunities for School Bus Fleets
- ?? Opportunities for Taxis and Liveries
- ?? Opportunities for Private Delivery Fleets
- ?? Summary of AFV Projects in NYC
- ?? Funding Resources for AFV Projects in NYC
- ?? Partnership Resource List
- ?? Planning Committee Contact List
- ?? Map of Priority Communities
- ?? Summary of Environmental Justice movement in NYC related to AFVs
- ?? AFV Fact Sheet