

Analysis of Alternative Fuels & Vehicles for Taxicab Fleets

Prepared by the Taxicab, Limousine & Paratransit Association

(Adopted July 31, 2009)

Taxicab fleet executives are questioning whether it makes operational and economic sense to convert to alternative fuel vehicles. To investigate and respond to this question, a TLPA Vehicle Task Force of 15 industry leaders was appointed to gather data and make a recommendation on alternative fuel taxicabs. In preparation for the Task Force's internal debate on this important matter, articles were collected, fleet operators were interviewed and the promotional materials from alternative fuel vehicle advocates evaluated. The Task Force also reviewed the two court cases in New York City where a federal judge overturned the city's mandate and subsequent financial disincentive scheme to try to force that taxicabs be alternative fuel vehicles.

From the standpoint of fleet executives, the jury is out on the issue of whether or not it makes sense for the taxicab industry to be a leader in the conversion from standard gasoline powered sedans to alternative fuel vehicles. The fact that the majority of the taxicab industry's economics is based on the purchase of used, large sedans (often two year old police vehicles) works against the industry purchasing new and more costly alternative fuel vehicles. Alternative fuel advocates, on the other hand, believe that reduction in fuel consumption and/or emissions outweighs operational efficiency, cost of service, and passenger safety and comfort. The general public has not yet weighed in on whether they are willing to pay to sit in a smaller, more environmentally friendly vehicle.

There are successes and failures when it comes to the introduction of alternative fuel vehicles in the taxicab industry. The bottom line, however, is that the TLPA Vehicle Task Force believes that technology is evolving to make widespread use of alternative fuels no longer the dream of the future but a reality that already works for some today and may soon be ready to work for all in the taxicab industry. The announcement of new vehicle emission and miles per gallon standards made by President Obama on May 19, 2009, will further speed automobile manufacturers' development of commercial fleet worthy alternative fuel vehicles. The proposed new policy for the first time merges fuel-efficiency standards for vehicles with limits on tailpipe pollutants. The new Corporate Average Fuel Economy standard will begin in model year 2012. Automakers will be required to have a fleet average of 35.5 miles a gallon and to reduce tailpipe emission by 30 percent by the year 2016.

In conducting its analysis of alternative fuel vehicles available to meet commercial passenger fleet operator needs, the TLPA Vehicle Task Force has made the following conclusions:

- 1. As of July 2009, an alternative fuel vehicle adequate for taxicab service that meets consumer needs (i.e., adequate space for multiple passengers and their luggage; fleet operations durability and safety; a convenient fuel distribution system that allows unfettered passenger travel; and cost effectiveness) is not widely available and we are not certain when such a vehicle and fuel will be generally available.**
- 2. The pace of technological advancements in alternative fuel vehicles is accelerating and it is very likely that within the next few years there will be an affordable and nationally available alternative fuel vehicle that does meet the taxicab industry's operational needs,**

our passengers' safety and comfort needs, provides for significant reductions in emissions, and is far more fuel efficient than today's typical taxicab.

3. **Financial and operational incentives and the transition of police departments to alternative fuel vehicles will speed the taxicab industry's transition to alternative fuel vehicles. Since a major portion of the taxicab industry purchases used police vehicles, once police departments find a suitable alternative fuel vehicle, then soon thereafter the taxicab industry is likely to have its alternative fuel vehicle of choice. On the other hand, imposition of legally challengeable local mandates serve to create delays and resentments, slowing the real progress toward a workable solution that serves the needs of consumers, fleet operators and politicians.**
4. **The new national vehicle standards announced by President Obama should lead automobile manufacturers to develop alternative fuel vehicles designed for commercial passenger fleets. No such original equipment manufactured alternative fuel vehicle exists today. Soon, the taxicab industry should have a choice of alternative fuel sedans that are designed for and built to stand up to intense commercial passenger fleet use.**
5. **No alternative fuel to gasoline currently has a reliable network (statewide or national) of fueling stations that meet the diverse and unscheduled passenger transportation needs of the taxicab industry. A reliable fueling network and better refueling techniques (speed, safety, and ease) are needed. As for the promise of hybrid vehicles, the shortage of production capability needs to be resolved to make the batteries available in greater numbers, which should lead to greater availability of a variety of hybrid sedans at a lower cost.**

TLPA

The Taxicab, Limousine & Paratransit Association (TLPA), formed in 1917, is the national organization that represents the owners and managers of taxicab, limousine, sedan, airport shuttle, paratransit, and non-emergency medical fleets. TLPA has approximately 1,000 member companies that operate over 100,000 passenger vehicles. TLPA member companies transport over 2 million passengers each day — more than 900 million passengers annually.

The taxicab, limousine, and paratransit industry is an essential part of public transportation that is vital to this country's commerce and mobility, to the relief of traffic congestion, and to improving the environment. The private taxicab, limousine, and paratransit industry transports 2 billion passengers annually, compared with the 10 billion passengers transported by public transit; provides half of all the specialized paratransit services furnished to persons with disabilities; serves as a feeder service to major transit stations and airports; and provides about half of its service to transportation disadvantaged people. It is our industry's service flexibility that makes us the public's choice to provide the first and last segments of a trip, and which enable the passenger to not use his/her private automobile.

Executive Summary

Cars, buses, trucks, planes and other mobile sources account for almost a third (27.9%) of the total air pollution in the United States, according to the Environmental Protection Agency (EPA), which established vehicle emission standards for cars and trucks in the early 1970s. Since that time,

Congress has made vehicle emissions standards increasingly more stringent to address national air quality concerns. Currently, it is estimated that personal vehicles (sedans and light trucks) account for 17% of total air pollution.

State and local government entities are also working to enhance air quality. California is known for establishing more stringent automobile emission standards than the federal standards. Local governments and public entities are also promoting improved air quality through a variety of actions including funding alternative fuel transit buses, making alternative fuel vehicles a substantial advantage or outright requirement when competitively bidding service contracts such as for garbage collection or the priority taxicab concession at the airport, and most recently we have heard of a few police departments that are beginning to investigate the use of alternative fuel vehicles.

Since 2007, New York City, San Francisco, Boston and Seattle have issued local mandates requiring all taxicab fleets to achieve certain city driving mileage per gallon requirements in the near future. The requirements in New York City and Boston were withdrawn by the cities after federal judges issued injunctions, barring the cities from enforcing the rules. The principal reason for the judicial finding was that the plaintiffs were likely to prevail on their argument that when Congress enacted corporate average fuel economy (“CAFE”) standards in the Energy Policy and Conservation Act of 1975 (“EPCA”), it had pre-empted state or municipal regulations “related to fuel economy standards or average fuel economy standards for automobiles covered by an average fuel economy standard” under the EPCA. It appears the other city mandates, which are based on fuel economy standards are also preempted by federal law.

While some taxicab companies have had success with the currently available alternative fuel vehicles, taxicab fleets have documented numerous serious problems. Part of the reason for the different reports from taxicab companies is the different operating styles in the industry. Where the taxicab driver owns the alternative fuel vehicle or a taxicab fleet restricts access to the alternative fuel vehicle to selected drivers the results are far better than for the industry norm of the fleet owning the vehicle and providing the vehicle to any qualified taxicab driver on any given day.

The problems reported by typical taxicab fleet operators include:

- **Fueling infrastructure to support alternative fuel vehicles:** Except for a few areas in California and some large cities elsewhere, compressed natural gas fueling stations are few and far between. As for hydrogen fuel stations, there are only 62 in service in the entire country and there is still debate on the viability of an affordable hydrogen vehicle. Also, if there is a mass movement to all-electric vehicles, there is a real question as to whether or not the U.S. electric utility grid can handle the strain that would be caused by rechargeable cars. Regardless of the type of fuel, the distribution system needs to be comprehensive and the time it takes to refuel must be quick, easy and extremely safe.
- **Safety of small vehicles:** Most of the hybrid vehicles currently in production, led by the Toyota Prius, are much smaller than the ubiquitous Ford Crown Victoria raising concerns about the safety of passengers in accidents; and in Baltimore, Boston, New York City and other cities where safety partitions are required between the front and rear passenger compartments, the common injuries resulting from passengers legs, knees and faces hitting these partitions in very minor accidents.

- **Durability of smaller vehicles:** The vehicle must have the ability to stand up to the wear and tear they face when being used as taxicab vehicles. While the average passenger vehicle travels fewer than 1,000 miles a month, the average commercial taxicab vehicle travels about 5,000 miles per month. According to Wade Hoyt, a Toyota spokesman in discussing the use of Priuses as taxicabs in New York City, “Our engineers are nervous about it because they were not designed for commercial use.” The taxicab industry needs a quality full size sedan to be produced as a hybrid.
- **Availability of hybrid vehicles:** The key component of hybrids, the battery to power the electric motor, is not readily available. Before the current downturn in the world economy, both Toyota and Honda announced plans to build new plants to significantly increase the number of batteries for hybrids. Toyota has stated that it should be able to increase its production of the Prius from the current 200,000 per year to one million vehicles per year sometime after 2010. Honda has announced that it will be able to increase its annual production of hybrids to 500,000 sometime after 2010. Also, the batteries are only warranted for the first 100,000 or 150,000 miles (depending on the manufacturer). Since taxicabs average about 60,000 miles per year taxicab companies will be subject to buying a new \$5,000 to \$7,000 hybrid battery after only a couple of years, which, if realized, would dramatically affect the operating cost of the vehicle.

Despite concerns and reservations, a few TLPA member fleets (Yellow Cab Cooperative and Luxor Cab in San Francisco, and the Yellow Checker Star companies in Las Vegas) are pioneering the industry’s serious experimentation with alternative fuel vehicles. Each of these fleets has four or more consecutive years of experience with testing alternative fuel taxicabs. This paper summarizes the experiences of these companies and also reviews some fleets with less experience.

The paper provides three informative appendices. Appendix A reviews the experiences of New York City taxicab fleets with alternative fuel vehicles, and the legal defeat of the New York City and Boston alternative fuel taxicab mandates. Appendix B reviews incentives, primarily federal tax incentives, to convert to alternative fuel vehicles. Appendix C provides a summary of the experiences of taxicab companies in Australia, Canada and England with alternative fuel programs.

Introduction

“In 1977, Jimmy Carter told the American people that they would have to balance the nation’s demand for energy with its ‘rapidly shrinking resources’ or the result ‘may be a national catastrophe.’ It was a problem, the President said, ‘that we will not solve in the next few years, and it is likely to get progressively worse through the rest of this century. We must not be selfish or timid if we hope to have a decent world for our children or grandchildren’.”¹

Now 32 years later, these dire predictions made by President Carter have become part of our national consciousness. A day does not go by where we are not assailed by terms such as global warming, greenhouse-gas emissions, carbon-neutral businesses and green this or green that.

Along with this push for the greening of America, in some large cities including San Francisco and Seattle, TLPA members are facing mandates to convert the majority of their fleets to alternative fuel

¹ Specter, Michael. “Big Foot” *The New Yorker*, February 25, 2008, pp. 44-53.

vehicles. Very recently, the mandates in New York City and Boston were challenged in federal court and both judges have ruled the mandates violate federal law and they blocked the implementation of the mandates. Other cities, such as Cambridge, Massachusetts are offering financial incentives rather than mandates to encourage companies to add alternative fuel vehicles to their fleets.

There are a number of examples of TLPA member fleets experimenting with alternative fuel vehicles because they hope it makes good business sense. Most of this experimentation began in the summer of 2008 when the average cost for a gallon of regular gasoline surpassed \$3.50 per gallon (and in some areas exceeded \$4.00 per gallon) in the United States.

Significant U.S. Fleet Experiences With Green Taxicabs — four or more years experience

Yellow Cab Cooperative of San Francisco probably has the longest experience of any U.S. TLPA member with hybrid vehicles starting with the addition of 10 Ford Escape Hybrids in 2005, followed by 15 Escape Hybrids in 2006, an additional 15 Escape Hybrids added to its fleet in 2008, and new hybrids on order for 2009. Hal Mellegard, General Manager of Yellow Cab Cooperative summarizes the company's experiences as follows:

The drivers love them. They can sit up high and have a better view of what's around them. They all tell me that the seats are very comfortable and that it's easy on their backs. The gas is usually (with today's prices) about \$25 less per shift than our Crown Victorias. Now the other side is that the new cars cost about \$28,000 or \$5,000 more than a new Crown Vic. Everything is good for the first year but then the maintenance starts to add up. The motor mounts go fairly regularly. We have trouble with the axles. There are 3 water pumps on each vehicle and if one of them goes out (and they will every 50,000 miles) the car stops. They don't come as a taxi package so the cloth interior looks horrible in a few months and if a battery goes, it's about \$7,000 for a new one. To date, we have had three batteries fail. Even the cost to install a new transmission in a Ford Escape Hybrid, about \$3,500, is far more costly than a new Crown Vic transmission. Our mechanics have received special training so that they won't get electrocuted working on the hybrids. We do have some with 225,000 miles though and with a lot of maintenance. I think the moral is that there really is no such thing as a free lunch and that the money the driver saves today on fuel is spent tomorrow on parts and maintenance. We are under mandate to be 100% SULEV (the California Air Resources Board's rating of Super-Low Emission Vehicle) or better by the end of 2011, and we are charging the drivers a higher daily gate on the 'clean vehicles' (\$7.50 per shift in addition to the \$5.00 paid by every lease driver on every shift to help pay for the new hybrids we have to add in the future to meet the mandate).

Yellow Cab Cooperative of San Francisco also operates about 100 CNG (compressed natural gas) vehicles. The vehicles are converted Ford Crown Victoria sedans. Mr. Mellgard reported the following to us regarding the CNG fueled taxicabs they operate.

We have a CNG station on our property and besides that a relatively good CNG infrastructure in the Bay area. There are about 6 CNG stations in San Francisco. All of the Bay area airports have stations and most major cities around San Francisco also have stations. As to incentives, 140 San Francisco taxis get "front of the line

privileges" at the airport with no waiting. So, we have about 100 of our 500 cars running on CNG.

TLPA member John Lazar, President and General Manager of Luxor Cabs in San Francisco also has extensive experience with hybrid and alternative fuel vehicles. He stated:

In our program for clean air cars and low fuel emission cars, we have looked at the following:

In 2005 we purchased 6 Ford Escape Hybrids. We run two 10-hour shifts, 7 days per week. We made sure that we handpicked the driving crews allowing no more than 4 drivers per hybrid cab. We have not had many major failures: a few transmissions, no battery failure, and the tires and brakes lasted longer. We have noticed a extreme increase in the cost for parts on the 2008 and 2009 models that now have airbags costing \$3,500 and a new transmission costing \$3,500 with an additional \$1,500 to have it installed. Drivers are very happy with performance, handling and fuel consumption. We now have 300,000 miles on them and recently purchased 25 more Ford Escape Hybrids. We did have to change out the interior due to cloth seats getting dirty and we replaced them with vinyl after 150,000 miles. The key to these cars in my opinion is the number of drivers you put on them, and that you have to listen to drivers' problems. We have been able to get after-market parts for the cars from Kass in Florida. We have installed running boards and purchased a stool for the elderly and customers with medical problems to assist in getting in this higher entry vehicle. In some parts of the country where weather is a factor using air conditioning and heaters much of the time, operators will not get the fuel performance from the battery power. We have not had any major accidents with the Escapes so I cannot respond to costs for major repairs.

We have two other hybrids we are testing. We have a 2008 Toyota Prius and have had no complaints, but there are only 100,000 miles on it. We also have a 2008 Toyota Camry Hybrid that seems like a good car, but we have only recently placed this vehicle into service and have no operating experience with it.

We are also operating seven Ford Crown Vics with compressed natural gas. We have learned the 2007 manifolds are cast iron and hold up much better than the aluminum heads.

The Yellow-Checker-Star taxicab companies in Las Vegas have used propane for over 25 years and have their own re-fueling station. The company operates 850 taxicabs, 830 of which are powered by propane. Bill Shranko, Chief Operating Officer of Yellow Checker Star, stated there are costs involved in striving to be a "green" taxicab company. He said:

It costs \$4,500 to retrofit a vehicle for propane fueling for which there is currently a government incentive that pays half of this conversion cost. Our company owners have been committed to using clean-burning propane before "green" was fashionable and have stayed the course despite it not being as economical as one might think. While the cost per gallon of propane is less than a gallon of regular gasoline, when you consider the cost of retrofitting, the cost of shipping (as the fuel comes from a long

distance away) and the fact that at about 10 miles to a gallon the company's propane powered taxicabs are about 20% less fuel efficient than a Crown Victoria, the overall propane cost is competitive with a conventional taxicab. When the price of gasoline exceeds \$4.00 per gallon, propane costs are less than gasoline on an equivalent per vehicle mile basis. One of the big benefits of propane is that the company has much lower maintenance costs as clean-burning propane usage greatly lessens the wear and tear on engines. Also, propane is readily available in the U.S. so there is no dependence on foreign oil and most importantly, Yellow-Checker-Star's use of propane results in a savings of 1,000 tons of particulates and 1,000 tons of carbon monoxide from being released into the atmosphere each year. I don't believe many taxicab companies will consider converting to propane, despite its tremendous environmental advantages until the Federal government greatly reduces conversion restrictions.

New U.S. Entrants into Green Taxicabs — less than three years experience

Out of over 1,000 member companies, the following five member companies (in addition to the three companies listed above) responded to the Task Force's call for a sharing of information by fleets that placed five or more alternative fuel taxicabs into service before May of 2008.

In May 2007, Metro Taxi, Denver's largest taxi service, launched Denver's first hybrid taxi and since then has added hybrid taxis and implemented other environmentally friendly practices. Metro Taxi of Denver President, Robert McBride, provided the following information on the company's interest in hybrid vehicles:

In April of 2007, Christopher Cotter came on board with the Metro Taxi team to instill a new line of business thinking in the way of sustainability. The goal was for Metro Taxi to operate in a more environmentally friendly manner, while also continuing to focus on the bottom line. His initial focus of energy conservation was on the office buildings and then we broadened the program to include the fleet. In May of 2007, we purchased a Toyota Prius for taxi fleet use. He selected five of our better drivers. He asked them to keep track of their fuel spending and do some analysis on the costs/benefits. Because the car is brand-new and costs quite a bit more than the older Ford Crown Victorias, we are charging the driver a higher weekly lease to drive the car. Overall, the drivers' found that they were making more money including the additional cash going towards the higher lease rates. We are 14 months deep into our environmental program. We have cut our energy needs by 60% inside our headquarters. We have put a total of 25 Prius vehicles on the road, and we have 2 hybrid owner/drivers. Our highest mileage Prius has gone 80,000 miles and other than normal services, we have only replaced one headlight. In addition to that, we have not even replaced a single set of brake pads yet. While the cloth interior is not optimal, we are looking into seat cover options that should make the cleanliness easier in the long run. Lastly, we have been featured in every single news network and local newspaper in the Colorado area for our "green" efforts. We have received more positive press for going green in one year than we have had in the combined 25 years of operation. So far, the Toyota Prius has been a great car for the Metro Taxi fleet.

On March 15, 2008, Yellow Cab of Denver announced its commitment to going green. The company rolled out both hybrid and propane-fueled taxis in a move aimed partly at helping its drivers cope with the rising cost of gasoline. “Our goal is to get the fuel costs down so we don’t have to continually increase the fares,” said Randy Jensen, a Yellow Cab executive. Yellow Cab’s efforts include adding Toyota Prius and Ford Escape hybrids in its Boulder fleet, along with those it had previously introduced in Denver. Since many Yellow Cab drivers buy and maintain their own taxis, the company estimates the annual fuel savings of about \$5,000 can nearly offset the higher price tag of a hybrid. “We’ve done some calculations on it,” said Brad Whittle, president of Colorado Cab, the parent of both Denver and Boulder Yellow Cab. “The fuel savings more than pays for the cost of the vehicle.” The company is also converting conventional sedans to a bi-fuel system that runs mostly on cleaner-burning propane. The cars would use gasoline only until the engine warms up and also as a backup option if propane runs low between fill-ups.²

In April 2008, Total Transit, Glendale, Arizona, took delivery of the first 20 of a planned 200 Toyota Prius cars it will add to its fleet of taxis that operate across the Phoenix region. Company owner Craig Hughes expects to save about 800,000 gallons of fuel each year with the fuel-efficient cars, which translates into an annual savings of about \$14,000 per vehicle. The new fleet will also reduce carbon dioxide emissions that contribute to global warming by 8,000 tons a year. After a lengthy study, Hughes said that he believes the economics of the Prius will pay off for his taxicab company. Although the initial cost is higher than the Ford Crown Victorias used in his fleet, the gas savings will more than offset that during the expected life of the vehicles, he said. The key will be whether the gasoline-electric hybrids will be sturdy enough to avoid high maintenance costs under heavy-duty taxi-driving conditions, he said. “It’s pretty easy to fix the Crown Vics,” he said. “The jury will be out on that (Prius maintenance costs) for a while.”

Hughes has looked at alternative vehicles for several years, because Phoenix Sky Harbor Airport has required compressed natural gas (CNG) vehicles for its last bid for taxicabs to serve the airport three years ago. However, Total Transit found that taxicabs that were modified to run on CNG have been plagued with maintenance problems. A hybrid Ford Escape SUV didn’t work out economically, and a Honda Civic Hybrid was too small for customer comfort. After extensive research, Hughes thinks the Prius may be the answer. “The back seat is big enough for three people, and the car has a good crash-test rating — important for rider safety, he said.”³

In April 2008, Broadway Cab, Portland, Oregon, added six hybrid Toyota Prius compacts to its fleet, a test that could lead the company to replace half of its 205-taxi fleet with gas-electric cars. General Manager Raye Miles said Broadway researched experiences in other cities, where companies have a few hybrids. While hybrids save on gas, Miles said, they could be more expensive to buy and maintain. She said she pays about \$5,000 to \$7,000 for conventional replacement cabs. Priuses can cost at least three times more, she said. Broadway mechanics figure they can maintain about half of the hybrids’ systems, she said, but they’ll have to send out other fixes to Toyota dealers.

TLPA member Neal Nichols, Arlington, Virginia, operates a total of 39 hybrid vehicles in two of his fleets. Red Top Cab of Arlington features 17 Toyota Camrys, 5 Ford Escapes and 2 Toyota Highlanders. Arlington Yellow Cab features 13 Toyota Camrys, 1 Toyota Highlander and 1 Toyota

² Kelley, Joanne. “Yellow Cab Rolls Out Hybrid Taxis” *Rocky Mountain News*, March 15, 2008.

³ Taylor, Ed. “Valley’s Discount Cab Goes Green” *East Valley Tribune*, April 28, 2008.

Prius. Mr. Nichols told TLPA that the hybrids have been operating for too short a period of time to assess the quality of their operating performances. He also reported that the taxicab company is experimenting with the introduction of a bi-fuel vehicle that operates on gasoline and propane.

According to Mr. Nichols,

Both Virginia and Arlington County recognize ethane, methane and propane as alternate fuels as long as the vehicle is primarily powered by the alternate fuel. We are seriously investigating using a bi-fuel vehicle that runs on gasoline and propane. We can get better mileage out of the propane vehicle if we use a leaner mixture than in a solely propane-powered vehicle, but then the vehicle will not start and operate on propane when the engine is cold. With the bi-fuel vehicle, once the engine starts and warms up on gasoline, it then switches exclusively to propane.

We are experimenting with one converted Crown Vic for now. The conversion costs approximately \$4,000 per vehicle. Given the current cost of propane and the current \$0.50 per gallon federal rebate for propane used as a motor fuel (due to expire 12/31/09 unless renewed), we estimate that a fleet conversion to this system will pay for itself in approximately 1.5 years. After that, if the costs remain proportional to gasoline as currently, and the federal rebate remains in place, then our fleet would save approximately \$250,000 per year in fuel costs based on a 100-taxicab conversion. We are participating in a stimulus grant proposal to the U.S. Government that, if approved, will fund converting 100 of our taxicabs to bi-fuel vehicles.

The ecological benefits of operating on propane are that it produces less greenhouse emissions than gasoline, particularly carbon emissions, which we are all told are responsible for global warming. The additional economic benefit of propane is that 90% of propane is produced in the United States. So, when you purchase propane, you are not sending American dollars to some other country. Consequently, the dual benefits of using the bi-fuel vehicle are leading us to very seriously consider converting a major portion of our fleet to this alternate fuel source.

There were many other TLPA member fleets that reported testing one or two alternative fuel taxicabs (primarily hybrids).

Impact on Taxicab Drivers

Converting to alternative fuels will have a significant impact on taxicab drivers. How the driver is impacted will depend most heavily on whether the driver owns his own vehicle or leases it from a company or another owner, although other factors come into play as well.

Approximately 90% of all taxicab drivers in the United States are self-employed independent businesspeople — not employees. In such arrangements, the drivers account for all of their fares, and they rarely report revenues to the company. Whether the driver owns or leases his taxicab usually determines how certain expenses are divided up.

In a typical taxicab lease arrangement, expenses borne by the driver include the lease payment to the owner or the company, necessary taxicab driver permits, cell phone bills, passenger pickup fees at

the airport and other tolls, and fuel for the taxicab. From the lease fee, the company or vehicle owner will pay for a vehicle that is licensed and equipped (two-way communications, taximeter, top light, etc.) to provide taxicab service, maintenance for the vehicle, liability insurance, access to the dispatch center, marketing, and accounting to process credit/debit cards, company vouchers and third party payers (contract trips).

Where the driver owns his own vehicle, the driver is typically referred to as an owner-driver. Owner-drivers pay all of the costs borne by drivers in a lease arrangement, but they also pay for the vehicle, its equipment and maintenance. Because these items are not a part of the lease, the owner-driver would pay lower fees to the taxicab company

For owner-drivers, the effect of an alternative fuel mandate is clear, i.e., the driver is paying 100% of the cost of acquiring, fueling, maintaining and disposing of the vehicle. Over the life of the vehicle, if the acquisition cost, operating cost (including fuel), maintenance cost, and depreciation combine to exceed the cost of that of a standard taxicab vehicle, then the driver's income will suffer by the difference. Therefore, for an alternative fuel vehicle not to be harmful to a driver's income, the overall fuel savings must more than make up for the higher cost of acquiring, operating and maintaining the vehicle.

In a lease arrangement, a hybrid's benefit of fuel cost savings, borne by the driver, is disconnected from the vehicle's higher purchase and maintenance costs, which are borne by the owner. This issue is sometimes addressed by surcharging the lease driver for the hybrid, so that both the driver and the owner benefit from the fuel savings. In a typical community outside of the top ten metropolitan areas in the United States, taxicabs average about 1.2 shifts per day. The going rate differential for a hybrid taxicab over a regular taxicab is approximately \$12.50 per shift or the equivalent of \$15.00 per vehicle per day. In larger cities that can double-shift a taxicab, such as San Francisco, the \$15.00 can be split evenly over the two shifts.

In such arrangements, the driver still saves money. A typical situation could be assumed as follows: 1) the average taxicab driver drives about 160 miles in a shift, 2) the alternative fuel taxicab achieves 40 miles per gallon of fuel, 3) the regular taxicab achieves 15 miles per gallon, and 4) that a gallon of fuel for the taxicab costs \$3.00. Under these assumptions, the driver will save a total of \$20.62 per day on fuel, of which he or she pays \$12.50 in a higher lease fee to the taxicab company for the company to use to cover the higher acquisition and maintenance costs, leaving the driver with a net increase in his or her income of \$8.12 per day. When the cost of fuel goes up to \$4.00 per gallon, then the driver's income increases to about \$15.00 per day. The higher the mileage and/or the higher the cost of fuel, the more advantageous it is for the driver to lease an alternative fuel taxicab.

Another concern for owner-drivers is the financing arrangements for vehicles that require a much higher capital investment. The purchase of alternative fuel vehicles, even if it makes long-term economic sense (life cycle costs) for the driver, is more difficult. To purchase a more expensive alternative fuel vehicle the driver has to produce a larger down payment (as much as three to four times as much) and pay larger monthly payments than would be the case if the driver were purchasing the typical used police vehicle. The differential in financing costs that result from financing a \$24,000 new hybrid versus a \$6,500 used Crown Victoria is very significant. Even for the second vehicle a driver purchases (to replace his or her taxicab when it needs to be retired), some

drivers will not set aside the daily savings in the cost of fuel to fund the upfront down payment required to purchase a replacement vehicle, and they may be forced to leave the business if they are not able to get acceptable financing terms.

Still another concern is the impact on drivers of the increased vehicle downtime due to maintenance. Taxicab fleet maintenance shops have learned to quickly and cheaply perform maintenance and repairs on Ford Crown Victorias. With the move to hybrid vehicles, many electrical maintenance issues must be handled by trained mechanics at factory dealerships, which cost the driver money in the form of lost revenue while the taxicab is out of service.

Finally, if the alternative fuel vehicle should use compressed natural gas (CNG), propane, or another fuel other than gasoline, diesel or electric battery, then the refueling process gets called into question. Any alternate fuel used by taxicab drivers would need to be available throughout the geographic area serviced by the drivers, would need to be safe to handle with minimal training to drivers, and the refueling would need to be accomplished in minutes rather than hours.

Types of Alternative Fuels and Alternative Fuel Vehicles (AFV)⁴

The Alternative Fuels and Advanced Vehicles Data Center (AFDC, formerly known as the Alternative Fuels Data Center) provides a wide range of information and resources to enable the use of alternative fuels (as defined by the Energy Policy Act of 1992), in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction, and fuel economy. The following fuels are defined as alternative fuels by the Energy Policy Act (EPA) of 1992: pure methanol, ethanol, and other alcohols; blends of 85% or more of alcohol with gasoline; natural gas and liquid fuels domestically produced from natural gas; liquefied petroleum gas (propane); coal-derived liquid fuels; hydrogen; electricity; pure biodiesel (B100); fuels, other than alcohol, derived from biological materials; and P-Series fuels. In addition, the U.S. Department of Energy (DOE) is authorized to designate other fuels as alternative fuels, provided that the fuel is substantially non-petroleum, yields substantial energy security benefits, and offers substantial environmental benefits. Also, as amended in January 2008, Section 301 of EPA Act of 1992 defines AFVs to include hybrid electric vehicles, fuel cell vehicles, and advanced lean burn vehicles. The current choices for alternative fuel vehicles on the road today include:

Hybrid

Hybrid electric vehicles: There are three types of hybrids:

- Single-mode hybrids that are electrically powered at low speeds and gasoline powered at high speeds
- Two-mode hybrids which feature low and high-speed electric variable transmissions, i.e., two sets of gears: one for the internal combustion engine and another set for the electric engine resulting in improved fuel economy in both city and highway driving and are adaptable to gasoline, diesel or E-85 engines regardless of the cylinder configuration
- Plug-In Hybrids which feature a large, high-capacity battery that can be recharged by traditional

⁴ Some of this AFV information was adapted from a webinar “Green Fleet Vehicles – What You Should Know” sponsored by Merchants Leasing, Manchester, NH, October 25, 2007.

hybrid methods and by plugging into a household current

Most current hybrids (including Ford Escapes and Toyota Priuses) are of the single-mode type and are very efficient in stop and go city driving, however, they cannot compete with the mileage of traditional gasoline or diesel alternatives in highway driving as the battery adds considerable weight to the vehicle. Also, sustained uphill driving may drain the battery. The replacement cost of the battery, which ranges from \$5,000 for a Prius to \$7,000 for a Ford Escape, may make the vehicle too costly for a typical taxicab fleet vehicle.

E-85

E-85 Flexible Fuel Vehicles: E-85 is a mixture of 85% ethanol, and 15% gasoline, which produces fewer emissions than gasoline. Flexible fuel vehicles can run on either E-85 or gasoline. The added vehicle cost is very low and E-85 is as much as 50 cents per gallon cheaper than regular unleaded gasoline. It has a higher octane than gasoline so vehicles can be tuned for higher performance. On the other hand, fuel mileage is lower compared to gasoline and diesel (by 10-15%). Only 1,134 of 170,000 public service stations sell E-85 (one out of every 170) and retail gas outlets are being slow to invest the thousands of dollars it takes to add E-85 capacity. Also, the majority of ethanol is derived from corn although new technologies will allow for production from biomass waste facilities. Ethanol is expensive to produce and some analysts say its increased production has contributed to an increase in food prices. Saab offers Saab BioPower engines that run on E-85 in both its 9-3 and 9-5 range of models. Saab has also developed the Saab BioPower Hybrid Concept, the world's first hybrid vehicle without fossil fuel emission.

Biodiesel

Biodiesel Fuel Vehicles: Biodiesel produces fewer emissions than pure petroleum diesel. Biodiesel is a form of diesel fuel manufactured from vegetable oils, animal fats, or recycled restaurant greases. It can be used in its pure form (B100) or blended with petroleum diesel (B20 - twenty percent biodiesel and 80% petroleum diesel). B20 is the most common biodiesel blend in the United States. Using B20 provides substantial benefits but avoids many of the cold-weather performance and material compatibility concerns associated with B100. In January 2001, the Biodiesel Final Rule made it possible for fleets to earn EPA credits for use of biodiesel blends of at least 20%. This rule does not make B20 an alternative fuel, but gives one credit for every 450 gallons of pure biodiesel used in biodiesel blends. B100 is biodegradable and produces less air pollutants than petroleum-based diesel. It can be used in any diesel engine with little or no modifications. The bio portion is domestically produced from non-petroleum, renewable resources. However, it is less available than gasoline and diesel (roughly 1,000 filling stations nationwide). It has lower fuel economy and power (10% lower for B100 and marginal for B20) it is even more expensive than regular diesel and B100 is not suitable for use in low temperatures.

Natural Gas (CNG & LNG/LPG)

Natural Gas Fuel Vehicles: Natural gas burns cleaner, more efficiently and completely than gasoline or diesel fuel, producing far fewer toxic pollutants and greenhouse gas emissions. Natural gas is a fossil fuel comprised mostly of methane. Methane is derived from a variety of sources such as oil shale, coal, natural gas or agricultural waste. Methanol can also be derived from landfills (LFG). There are two main natural gas fuel types: Compressed Natural Gas (CNG) and Liquefied Natural

Gas (LNG). LNG has a relatively high cost of production and the need to store it in expensive cryogenic tanks has prevented its widespread use in commercial applications.

- Compressed Natural Gas (CNG) is more than \$1.00 cheaper per gallon vs. regular unleaded gasoline. In April 2008, the equivalent of a gallon of CNG averaged \$2.04 compared with \$3.53 for a gallon of gasoline. There is a 30-40% reduction in greenhouse gas emissions with CNG powered vehicles. CNG has a higher octane than gasoline so vehicles can be tuned for better performance and more than 90% of natural gas is domestically produced. Unfortunately, there are very few filling stations. California has the largest infrastructure in the country with 450 total stations, however, only 160 are public access stations as most are installed and owned by private fleets. There are fewer than 2,000 CNG fueling stations nationwide. In the Washington, DC metropolitan area, for example, there are only four filling stations that offer CNG. CNG vehicles require a greater amount of space for fuel storage than conventional gasoline vehicles (CNG = 5x more space; LNG = 2x more space). Therefore, the range per gas tank of a CNG-powered vehicle is between 170 to 225 miles making it less than ideal for road trips especially with the limited refilling options. There are fewer than 120,000 CNG vehicles in the U.S. and many are fleets owned by public entities. It is also important to note that no CNG powered sedans or vans are manufactured any longer in the United States, so standard sedans and vans have to be converted to CNG. The current conversion costs for a sedan is approximately \$14,000 and for a van is \$18,000.
- Liquefied Petroleum Gas (LPG) is more commonly referred to as propane. Propane's popularity as an alternative transportation fuel stems mainly from its domestic availability, high energy density, and clean-burning qualities. It is the most commonly used alternative transportation fuel and the third most used vehicle fuel, behind gasoline and diesel. Propane produces up to 20 per cent fewer toxic pollutants and greenhouse gas emissions than gasoline vehicles. There are more than 200,000 propane-powered vehicles in the U.S. Propane is less expensive than gasoline, but gets fewer miles to the gallon. For example, in July 2009, the average price of a gallon of regular gasoline was \$2.44, the price of a gallon of propane was \$2.48, however because of differing energy contents per gallon between gasoline and propane, the price paid per unit of energy content can differ somewhat from the price paid per gallon. Therefore, while the price per gallon of gasoline was \$2.44 in July 2009, the price per an energy-equivalent gallon of propane was \$3.43. No propane-fueled light-duty passenger cars or trucks have been produced commercially in the U.S. since the 2004 model year. Gasoline and diesel vehicles can be retrofitted to run on propane in addition to regular fuel at a cost of about \$3,400. Less readily available than gasoline and diesel, there are 2,500 propane-refueling stations nationwide.

Hydrogen

Hydrogen-powered fuel cell vehicles have been in development for years and use a sophisticated electrochemical energy conversion device similar to a battery. The power is then put to the wheels via an electric motor. The fuel cell converts hydrogen and oxygen into water and in the process, it produces electricity. Despite the appeal of fuel cell cars an affordable, commercially available model is not on the horizon. There are, however, a number of concept and test fleet vehicles on the road. As of June 25, 2008 there were 69 operational Hydrogen Fueling Stations in the U.S. and Canada according to the Hydrogen Fueling Station database. There are another 41 stations in the planning stages. The realistic timeline for developing commercial hydrogen-powered vehicles is still a

question. It should be noted that in January, Ballard Power Systems of Vancouver, the world leader in the manufacturing of hydrogen fuel cells, sold the company's automotive fuel cell assets to Daimler AG and Ford Motor Company. John Sheridan, Ballard's President and CEO stated, "This transaction lowers Ballard's risk profile by addressing the realities of the high cost and long timeline for automotive fuel cell commercialization."

The American Enterprise Institute's Mr. Green said American interest in alternative fuels would wane if gasoline prices return to 2007 levels. "There's compelling evidence that oil will eventually fall back to the \$60-a-barrel range," he said. "It's a bubble; it's not a matter of scarcity. People won't switch from gas to hydrogen or anything else unless they really have to." Added Mr. Green: "My money's still on gas. Hey, the gas-powered Hondas get great mileage. Why bother with hydrogen-powered Hondas?"⁵

Electric

During the Olympic games, General Motors aired commercials introducing the Volt as the pinnacle of GM's fuel economy improvements and hybrid lineup. However, hundreds of GM engineers are working quickly to deal with the inevitable glitches from new technology. They must figure out how to keep the battery cool and adjust the car's suspension so it performs well while carrying a 400-pound battery pack. GM has promised to begin selling the Volt in November 2011. GM is saying the Volt will cost \$32,000 and that production volumes are expected to remain relatively low; 10,000 for the first year and 60,000 for the second year of production.

In the meantime, a potential drawback for electric cars in the U.S., the strain recharging vehicles could have on the electric grid system. Utilities have to be aware that increasing gasoline prices could push sales of rechargeable electric vehicles well into the millions by 2020, which could stress the grid system. Other possible problems include electric vehicles getting larger and requiring far more electricity for recharging, and demands from people that their vehicles be recharged quickly, drawing more electricity during peak times.

Diesel

While not an alternative fuel, diesel has always been known for outstanding fuel efficiency, with better mileage (by 25 percent to 40 percent) than gasoline. However, the kerosene-like fuel and the engines that burn it were dirty, noisy, dawdling and even deadly, linked to increased risk of cancer and respiratory disease. That has all changed, in part because of cleaner-burning fuel — its 2006 rollout had been mandated in 2000 by the Clinton administration — that have 97 percent less of the sulfur responsible for diesel engines' sooty particulates. The low-sulfur fuel, hailed by the Environmental Protection Agency as a historic advance, has opened the door to sophisticated emissions controls that let diesel engines meet the strict pollution standards of California. Those rules, the world's most stringent by far, require 2009-model diesels to be as green as gasoline or even hybrid models. Starting with the 2009 model year, several automakers have developed diesels clean enough to pass muster in all states, including the big California and New York markets.

⁵ Akasie, Jay. "Wave of the Future or Toy for 200 Environmentalists?" *The New York Sun*, June 17, 2008.

Under the hood, there is little to distinguish diesel engines from those that burn gasoline. Both use pistons, valves and electronic fuel injection, but the differences go beyond the form of petroleum that goes in the tank. Today's gasoline engines ignite their fuel with a high-voltage spark; diesels, also known as compression-ignition engines, light the fire with the heat generated by squeezing the air in the cylinders to a far greater degree. This is one of their main advantages: a compression ratio of nearly 20:1, compared with a maximum of about 12:1 for gasoline. This means that diesel engines extract more power from their fuel. The compression of a gasoline engine can't simply be cranked up higher — the gasoline would burn erratically. Diesel fuel, a petroleum distillate, will tolerate those high cylinder pressures. Another reason diesels get better mileage: the fuel contains 12 percent more energy a gallon. While diesel currently costs 16 percent more than gasoline, that premium is more than offset by mileage gains of 25 to 40 percent. Consumers would still save money with a diesel car, and they would fill it less frequently. The Mercedes E320 diesel sedan, for example, can cover roughly 700 highway miles on a tank. Next-generation lean-diesel models (certain 2009 models) are also eligible for federal tax credits of up to \$1,300.⁶

Reasons To Be Cautious About Jumping Onto the Hybrid Bandwagon

In the United States, except for the limited information provided by the TLPA members in San Francisco, there is almost no significant operational experience with hybrid vehicles in taxicab service for more than three years. Most TLPA members that have purchased hybrids have done so in the two past years and have yet to accumulate much significant operating data. However, a few operators in New York City have been operating some hybrids for 2.5 years. In April 2009 several taxicab fleet operators in New York City filed declarations in a federal court case seeking to block implementation of the New York City Taxi and Limousine Commission's (TLC) second attempt to impose alternative fuel mandates on taxicabs. The first attempt was overruled by a federal judge on October 31, 2008. On June 22, 2009, the TLC's second attempt was also found to be a violation of federal law (for more information on these cases see Appendix A of this paper). Regardless of the legal merits of mandates, the sworn statements made by New York City operators should prove useful to TLPA member operators considering incorporating hybrid vehicles into their fleets and to cities and states considering green incentive programs.

Ron Sherman, President of the Metropolitan Taxicab Board of Trade (MTBOT), a trade association representing approximately 3,400 yellow medallion taxis including approximately 340 hybrid taxicabs testified in April 2009 as to the alternatives to hybrids that exist or are about to exist for taxicab fleet owners. Mr. Sherman testified as follows for the vehicle that he believes will replace the Crown Victoria as the primary taxicab in the United States. He declared, "Instead of a hybrid mandate, the MTBOT proposed an alternative that would result in fuel savings and reduced emissions but would not sacrifice comfort, safety, or efficiency... The Transit Connect has a 22 mpg city and 25 mpg highway rating; is rated ULEVII by the EPA, which means that this vehicle emits, based on average driving cycles, less than 38 tons of carbon monoxide per year, and has 70% cleaner tail pipe emissions than the Crown Victoria; is built with heavy-duty parts and designed to run 24/7 as a commercial vehicle; and is designed to comply with all TLC requirements such as a partition. I saw the Transit Connect last week while it was in NYC for the auto show. It was painted yellow,

⁶ Ulrich, Lawrence. "Diesel Automobiles Clean Up for an Encore" *The New York Times*, May 18, 2008.

had a partition, and already met most of the other TLC requirements. Senior management representatives of Ford have told me repeatedly that it will be ready for purchase by the NYC taxi market this fall. I am very excited about this vehicle and think it could be the “Taxi of Tomorrow.” Defendants, however, rejected this proposal because the Transit Connect is not an alternative fuel vehicle.”

Michael Wanderman, Chief Operating Officer of Gotham Yellow LLC, testified in the New York City Case in April 2009. Below are excerpts from his testimony.

Of the 203 vehicles that Gotham leases on a daily or weekly basis, as of April 17, 2009, 163 will be Ford Escape Hybrids (“Escape Hybrids”) and 40 will be Crown Victorias. Gotham also has 12 stand-by vehicles (4 Escape Hybrids and 8 Crown Victorias). Gotham therefore operates 167 Escape Hybrids and 48 Crown Victorias (a total of 215 vehicles) that are available to be leased on a daily or weekly basis.

Gotham purchased its first Escape Hybrids (34 model-year 2007s) between mid-October and November 2006 since it purchased medallions in a TLC auction that could only be operated with alternative-fuel vehicles. At that time, Gotham operated approximately 71 Crown Victorias.

Since purchasing the first Escape Hybrids in 2006, Gotham has replaced all vehicles that it has retired with Escape Hybrids – except that it purchased 14 Crown Victorias in 2007 when Escape Hybrids were not readily available on the market.

Below by date are the number of Crown Victorias and Escape Hybrids Gotham leased on a daily or weekly basis (not including stand-by vehicles):

- a. October 1, 2006: 105 total 71 Crown Victorias & 34 hybrids
- b. December 31, 2006: 105 total 71 Crown Victorias & 34 hybrids
- c. December 31, 2007: 176 total 78 Crown Victorias & 98 hybrids
- d. December 31, 2008: 201 total 51 Crown Victorias & 150 hybrids
- e. April 17, 2009: 203 total 40 Crown Victorias & 163 hybrids

Due to the volume of hybrids it is operating, Gotham has more experience with hybrids used as taxis than all or almost all other owners or agents in the NYC taxicab industry.

As discussed in more detail below, Escape Hybrids are significantly more expensive to maintain than Crown Victorias. I have reviewed Gotham’s books in detail in an attempt to estimate, as closely as possible, how much more Escape Hybrids cost to operate than Crown Victorias and have determined that over the three-year life of a taxi, it costs approximately \$10,832 more to operate an Escape Hybrid, which is approximately \$3611 more per year per vehicle. I have set out my calculations below.

Purchase cost (\$3000): Due to its fleet discount, Gotham has been able to purchase 2009 Escape Hybrids for approximately \$28,000. Gotham has not purchased a Crown

Victoria lately, so I do not know the exact fleet discount I could negotiate. My understanding is that Crown Victorias cost approximately \$25,000. The purchase price for Escape Hybrids is therefore approximately \$3000 more, which if spread across the three-year life is \$1000 more per year per vehicle.

Hack up (\$875): Unlike the Crown Victorias, the Escape Hybrids are not prewired for taxi service, nor do they come with the required TLC specifications such as vinyl seats. Gotham therefore must spend an additional \$750 to \$1000 (on average \$875) per vehicle to “hack” up Escape Hybrids as required by the TLC.

Dealer costs (\$800 more over three years): Escape Hybrid parts cost significantly more than parts for Crown Victorias. In addition, there are many occasions when there are increased repair costs because the vehicles cannot be fixed in-house. Between October 2006, when Gotham first began operating Escape Hybrids, and the present, Gotham has incurred approximately \$75,000 in costs to dealers to repair Escape Hybrids. During that same time, Gotham has only incurred approximately \$9500 in dealer costs to repair Crown Victorias.

Gotham’s dealer costs are lower now than they were when it first started operating Crown Victorias because Gotham’s mechanics have gained more experience fixing the Escape Hybrids in-house. For example, problems with the steering shafts/knuckles on the 2008 and 2009 Escape Hybrids have caused tight steering in the 2008 and 2009 vehicles. Gotham has replaced over 112 columns and 54 knuckles of these to date, which cost approximately \$67,200. Originally Gotham had to have the dealer fix these, but Gotham now is able to do the fix inhouse. Similarly, problems with the throttle body on the 2008 Escape Hybrids have caused the vehicles to cut off and go into “limp” mode. Gotham replaced 80 of these to date, which cost \$6,500.

Lost shifts (\$156 more over three years): Escape Hybrids are out of service more than Crown Victorias because Escape Hybrid accidents take longer to repair. Repairs take longer due to the extra diagnostic steps required (particularly due to the complex computer system in the Escape Hybrids), and more Escape Hybrids must be sent to the dealer because Gotham mechanics are less frequently able to fix them. Dealer involvement causes delay.

Based on a review of Gotham’s books, I estimate that Gotham loses approximately 75 more shifts per year because it is running Escape Hybrids due to the lack of vehicles (“no supply” lost shifts). On average, the lease revenue from a shift is \$113. Gotham therefore loses approximately \$8,475 per year in lease income because it is running Escape Hybrids. This amounts to a loss of approximately \$52 per hybrid per year.

Additional Stand-By Vehicles (\$331 more over three years): To minimize the number of shifts we lose, Gotham has purchased two more stand-by vehicles than it would have purchased if it ran only Crown Victorias. Each stand-by vehicle costs approximately \$28,000 to purchase and \$1500 to hack up, plus approximately \$3100 annually in

additional costs (such as parts, maintenance, insurance, and city fees). An extra stand-by vehicle thus costs approximately \$45,000 over five years, which is the length of time Gotham runs them. The two extra stand-by vehicles therefore cost \$90,000 over five years, or \$18,000 a year. The added cost per medallion is \$110 per year (or \$331 over three years) because the total cost must be spread across the 163 medallions.

Regular in-house parts costs (\$1500 more over three years): Escape Hybrid parts cost more, and hybrids need more repairs than Crown Victorias. Because the Escape Hybrid is built as a consumer car not intended for commercial use, there were multiple changes in design between the 2007, 2008, and 2009 vehicles. In this industry, we need consistency in our cars year after year so we do not have to carry multiple inventories of common parts and constantly retrain our staff. Based on a review of Gotham's books, I estimate that over three years, it spends *approximately \$1500 more in parts on each hybrid*. This number would be \$1000 higher per car except that Gotham has saved approximately \$1000 per Escape Hybrid on transmission costs.

Accident part repair costs (\$1950 more over three years): The above estimate does not include the in-house cost of repairs when a hybrid has an accident. Escape Hybrid vehicles experience greater mechanical and body damage when in accidents due to their softer body and smaller frame. On average, every taxi gets into three accidents involving significant damage to the vehicle, over its life. When a Crown Victoria is in a serious accident, Gotham usually only needs to replace the bumper, at a cost of approximately \$100 in parts. When an Escape Hybrid is in an accident, Gotham usually must replace the bumper and the radiator, which costs between \$700 and \$800 in parts. Each accident therefore costs approximately \$600 or \$700 more, or on average \$650 more. Assuming three accidents over the life of the vehicle, accidents cost \$1950 more per Escape Hybrid

Totaled hybrids (\$1500 more over three years): Gotham is almost never forced to retire a Crown Victoria early due to an accident because our mechanics are able to fix them. Gotham has had to retire four Escape Hybrids early (in their first year of use) because they were totally destroyed in accidents. This is a loss of the approximately \$29,500 (\$28,000 purchase + \$1500 hack up) per vehicle, which is a total loss of \$118,000 (\$29,500 x 4 vehicles). Because Gotham has had an average of 94 Escape Hybrids on the road since October 2006, I estimate that Gotham lost approximately \$1255 per hybrid over the last 30 months. This is approximately \$500 a year, or \$1500 over 3 years.

In-house service costs (\$720 more over three years): Escape Hybrids also take approximately five times longer for Gotham's staff to repair due to the extensive time involved with having to properly diagnose (with IDS tools) an Escape Hybrid. On average, Gotham's mechanical staff is paid \$15 per hour. Each time an Escape Hybrid needs maintenance or to prepare for a TLC inspection, I estimate that Gotham must pay \$60 (\$75 as opposed to \$15) more in salary alone. Because the vehicles are

inspected three times a year and are in approximately one accident with significant body damage each year, I estimate that the increased cost in salary is \$240 per year per vehicle, which is \$720 more over the life of the vehicle.

I have not included in the above analysis the one-time costs associated with switching over to Escape Hybrids. While significant, these costs are relatively small assuming a fleet chooses one vehicle and sticks with it for many years. For example, Gotham invested approximately \$15,000 to purchase the diagnostic tools and computers necessary to properly diagnose, program, and repair the computer-related issues tied to Escape Hybrids.

In sum, it costs approximately \$10,832 more over the three-year life of a vehicle to operate an Escape Hybrid instead of a Crown Victoria, *which is approximately \$3611 more per Escape Hybrid per year.*

- a. \$3000 increased purchase cost
- b. \$875 increased hack up cost
- c. \$800 increased dealer costs over three years
- d. \$156 increased lost shift costs over three years
- e. \$331 increased extra stand-by vehicles costs over three years
- f. \$1500 increased regular in-house parts costs over three years
- g. \$1950 increased accident part repair costs over three years
- h. \$1500 increased costs dues to totaled hybrid over three years
- i. \$720 increased in-house service costs over three years

Michael Levine, President of Ronart Leasing Corp. also testified in April 2009 in the New York City case. His testimony strongly reinforced the testimony noted above. An excerpt of Mr. Levine's testimony follows:

Of the 187 vehicles that Ronart regularly leases on a daily or weekly basis, 35 are Ford Escape Hybrids, 9 are Altima Hybrids, and 143 are Crown Victorias. Ronart also has six Crown Victorias that are stand-by vehicles, bringing the total number of Crown Victorias it has available to lease on a daily or weekly basis to 149. Ronart therefore operates 44 hybrids and 149 Crown Victorias (a total of 193 vehicles) that are available for lease on a daily or weekly basis.

Of these 44 hybrids, 15 are model-year 2008 Escapes, 20 are model-year 2009 Escapes, and 9 are model-year 2009 Altimas.

I also operate a fleet of approximately 760 taxis in Chicago. Of those, approximately 20 are hybrids.

Unlike most operators in NYC, Ronart operates its vehicles as taxis for only 14 months in NYC. After 14 months, it sells the vehicles to Chicago fleets for approximately \$15,000 a vehicle (irrespective of the vehicle type).

Ronart purchased its first hybrids (two model-year 2008 Escapes) in December 2007 in order to test how they would perform as taxis. Ronart purchased additional hybrids at first to continue testing them, but then because there were no Crown Victorias available.

I make all vehicle purchasing decisions for Ronart. As detailed below, based on Ronart's experience operating both hybrids and Crown Victorias, Ronart strongly prefers to purchase and operate Crown Victorias. They are less expensive to purchase and maintain, they have a proven safety record, and they are more comfortable for both drivers and passengers than either the Ford Escape Hybrid or the Nissan Altima Hybrid. Additionally, the taller lighter Escapes have a tendency to flip over in minor accidents, which has never been a problem with the Crown Victorias. And drivers complain that the Nissan Altima does not have enough trunk space to do airport fares. The hybrids I have purchased and tested are not fit to be taxis. They are not built to be driven twenty-four hours a day, seven days a week ("24-7"), they do not have heavy-duty parts, and, most importantly, they are not as safe as the Crown Victorias that Ronart has been using for years.

I have reviewed Ronart's books in detail in an attempt to estimate, as closely as possible, the difference between the cost of operating a hybrid for fourteen months and the cost of operating a Crown Victoria for the same period. I have determined that it costs Ronart approximately \$5,730 more per year to operate one Escape than a Crown Victoria.

My calculations regarding the extra costs associated with hybrids are set forth in detail below.

Purchase cost (\$3448 per year if used for 14 months): Ronart purchases 2009 Escapes for approximately \$29,022.50 and Crown Victorias for approximately \$25,000.

Hack up (\$219 per year if used for 14 months): Ronart expends approximately \$843.50 to equip a Crown Victoria for service as a taxicab ("hack up") and approximately \$1,098.50 to hack up an Escape, a difference of \$255. If this one-time cost is spread across 14-months, the increased cost is approximately \$219 per year per hybrid.

Parts (\$1,500 per year): Ronart spends, on average, approximately \$250 per month (\$3,000 per year) on parts to service of Crown Victoria. Parts for Escapes cost Ronart approximately \$375 per month (\$4,500 per year). I therefore estimate that Ronart spends approximately \$1,500 more per year per vehicle on parts for Escapes.

Additional Stand-By Vehicles (\$563 per year): While Ronart's mechanics now can fix most problems with both Escapes and Crown Victorias in-house, it still takes significantly longer to fix an Escape, primarily because the parts are often on back order.

To minimize the number of shifts it loses, Ronart has purchased two more standby vehicles than it would have purchased if it ran only Crown Victorias. Four stand-by vehicles are sufficient to cover the 143 Crown Victorias, but an additional two stand-by vehicles are needed to cover only 44 hybrids. Each stand-by Escape costs \$30,121 to purchase and hack up. Because Ronart keeps stand-by vehicles for three years, those costs are approximately \$10,040 per year. For each stand-by Escape, Ronart also has to pay annually approximately \$17,500 per year (\$4,500 per year in maintenance, \$1,750 in city fees, \$9,500 in insurance, and \$1,750 in worker's compensation). The total cost per year of one Escape stand-by vehicle is therefore \$27,540. The cost of the two Escape stand-by vehicles is \$55,080. Spread over the 44 hybrids, that is approximately \$1,252 per hybrid per year. The cost of a Crown Victoria stand-by vehicle... is approximately \$689 per vehicle per year.

In sum, it costs Ronart approximately *\$5,730 more [per vehicle] per year for it to operate an Escape instead of a Crown Victoria, if it keeps the vehicle for 14 months.*

- a. \$3,448 purchase costs if spread over 14 months
- b. \$219 hack up costs if spread over 14 months
- c. \$1,500 parts
- d. \$563 extra stand-by vehicles cost

Jason Rosenzweig, Vice-President of Linden Maintenance Corp. also testified in the New York City case. His testimony strongly reinforced the other testimony noted above. A brief excerpt of Mr. Rosenzweig's testimony follows:

Linden has been operating double-shifted taxicabs since 1944 and currently operates 150 medallions. Linden currently leases 115 medallions on a daily basis and 32 on a weekly basis (for a total of 147 on a daily or weekly basis), and the other three medallions are leased to drivers who own their own vehicle. Linden has an additional eight stand-by vehicles, which are used if a leased vehicle is out of service for required repairs or inspections. Therefore, the total number of vehicles available to be leased is 155.

Linden operates all of its vehicles for three years, except that stand-by vehicles are operated for four.

Linden operates all Crown Victorias, except that it has one Ford Escape Hybrid and seven Chevy Malibu Hybrids. The Ford Escape Hybrid has been in service since July 2007. The seven Chevy Malibu Hybrids have been in service since July 2008. Linden was the first fleet to operate Malibus as taxis. Linden purchased these Malibus in order to test whether they were adequate vehicles for NYC taxi service as Linden has in the past with other new vehicles.

In order to determine if a new vehicle is durable enough for taxi service, it must be put into service as a taxi for a full three year cycle.

Based on my experience to date operating hybrid vehicles, I strongly believe that hybrids should not be mandated (or effectively mandated) because there are still many unanswered questions about the durability, reliability, comfort, and most importantly, safety of the hybrid vehicles.

I make purchasing decisions for Linden. As detailed below, Linden strongly prefers purchasing and operating Crown Victorias rather than hybrids or clean diesels. Not only are Crown Victorias safer, more reliable, and more durable, but they are also less expensive to purchase, operate, and repair. And because the hybrids are more frequently out of service, they cause financial harm to the driver who is left without a car and to the owner who loses lease payments.

In sum, I estimate that it will cost Linden approximately \$6,687 more over three years (\$2,229 per year) for it to operate a Malibu instead of a Crown Victoria.

- a. \$587 increased purchase cost and hack up
- b. \$1,600 increased costs for stand-by vehicles
- c. \$4,500 increased parts and service costs

There is also the question of whether it is legal for a local or regional governmental entity to require taxicabs to meet emission or fuel economy standards. In a lawsuit filed in federal court by the Metropolitan Taxicab Board of Trade (MTBOT) against the New York City Taxi and Limousine Commission, it was alleged that only the Federal government, or in some rare cases state legislatures, have the power to regulate emissions and fuel economy standards for any vehicles including taxicabs. The federal judge agreed in the original, straightforward mandate case in New York City as well as in the subsequent scheme New York City implemented to try to impose the mandate through financial disincentives imposed on taxicab vehicles that were not alternative fuel vehicles. A subsequent court case in Boston also struck down its green mandate for taxicabs. It appears that no taxicab regulatory authority or city council can implement such requirements. More information on this matter is contained in Appendix A.

What Does the Future Hold?

In August 2008, IBM Global Business Services' Institute for Business Value issued a paper, *Automotive 2020 – Clarity Beyond the Chaos*. The report, based on interviews with 125 auto industry executives in 15 countries, says the automobile industry is on the cusp of revolutionary changes that will see environmental sustainability and technological innovation become top priorities as automakers respond to consumer demands for more efficient cars that don't sacrifice performance, comfort or reliability.

The report states that all new cars will have some degree of hybridization by 2020, by which point battery technology will be ubiquitous and vehicles will communicate with one another and the road to make driving safer and easier. There is mounting agreement among automakers, policymakers and environmentalists that the electrification of the automobile is inevitable and most of the major automakers are developing hybrid and plug-in hybrid vehicles. Although such vehicles currently make up less than 3 percent of the market, the report finds "some degree of hybridization will be evident in all vehicles produced in 2020 and beyond." Battery technology will be ubiquitous within

12 years, the report states, and automakers and their suppliers will focus much of their R&D on the software and electronics needed to integrate them into vehicles. “Energy storage is in the heart of the next generation of efforts for fuel economy,” the report quotes one American executive saying.

Several automakers plan to offer electric vehicles in America beginning in 2010. Still, battery costs — which the report estimates at 10 to 15 percent of the cost of the cars that use them — will remain a significant barrier to rapid market penetration. Investment in biofuels will continue, although the technology “must undergo rapid evolution for global application and proliferation,” the report states, noting that ethanol from corn and other food crops is a dead end but cellulosic ethanol “has the potential to see widespread acceptance.” Traditional fossil fuels will comprise just 65 percent of the market by 2020, by which point average vehicle CO₂ emissions will fall to 97 grams per kilometer. As for hydrogen, keep waiting. Although the report finds “hydrogen fuel cell vehicles will remain a viable alternative,” even the optimists don’t see them comprising more than a small fraction of vehicles by 2020. Few expect the infrastructure needed to generate, transport and distribute hydrogen to be in place anytime soon.”⁷

Conclusion

At the May 2008 TLPA Spring Conference & Expo held in Kansas City, one TLPA member remarked that hybrid vehicles will make significant in-roads in our industry once police fleets are required to operate alternative fuel vehicles. There is a lot of truth to this statement, because much of the taxicab industry currently runs used police vehicles in their fleets.

This paper illustrates some of the issues to be considered by operators who want to add hybrids into their fleets and for cities who want to mandate better fuel mileage to achieve lower emissions. One key issue is the availability of hybrid vehicles. Fleets are competing with ordinary citizens who want a hybrid to lower their fuel costs. Unfortunately, a key component of hybrids, the battery to power the electric motor, is not readily available in large quantities. Both Toyota and Honda have announced plans to build new plants to significantly increase the number of batteries for hybrids. Toyota has stated that it should be able to increase the production of the Prius from the current 200,000 per year to one million vehicles per year sometime after 2010. Honda has announced that it will be able to increase its annual production of hybrids to 500,000 sometime after 2010. Bosch and Samsung SDI have established a joint venture, SB LiMotive, which has begun operations to develop, build, and market lithium-ion batteries for use in hybrid and electrical vehicles. The two firms expect the market volume for lithium-ion batteries to grow to 3 million vehicles by 2015. Recently, BMW chose SB LiMotive to supply lithium-ion batteries for its new electric Megacity Vehicle.

The phrases that are being used “sometime after 2010” and “in the next five years” are not helpful to those companies located in the cities implementing ‘green fleet’ mandates. What does this mean for San Francisco, New York, Boston and Seattle? It is hard to mandate for something that does not currently exist in sufficient quantities and which was not designed for commercial passenger fleet use. Also, one has to remember that we are discussing worldwide production. Of the 200,000 Priuses manufactured in 2008, only 50% were sold in the U.S. Now, the news that Ballard Power Systems of Vancouver, the world leader in the manufacturing of hydrogen fuel cells, sold the company’s

⁷ Squatriglia, Chuck, “Every New Car Will Be a Hybrid by 2020” *Wired Blog Network*, August 14, 2008. <http://blog.wired.com/cars/2008/08/every-new-car-w.htm>

automotive fuel cell assets because of “the realities of the high cost and long timeline for automotive fuel cell commercialization”⁸ is another example of how many years it could be for the next generation hybrids to become commercially viable in the marketplace.

The experience of Yellow Cab Cooperative of San Francisco and the New York City operators illustrate that hybrids remain untested in commercial use. There is a higher capital outlay to purchase hybrids and the on-going maintenance costs seem to be significantly higher than the current industry workhorse, the Crown Vic, and there is a very serious question of diminished reliability with hybrids. What will be the experiences once 3 to 5 years of demanding taxicab service miles are put on the cars? What will be the resale value for major city fleets that face age and model year restrictions?

As Hal Mellegard stated, “I think the moral is that there really is no such thing as a free lunch and that the money the driver saves today on fuel is spent tomorrow on parts and maintenance.”

As one probably expected, there are no simple answers to which vehicle is best at providing for fuel economy, reliability, low emissions, passenger comfort, safety, low maintenance cost, and long life. No one alternative fuel or alternative fuel vehicle has proven to meet all of these needs, but the industry is experimenting and as always TLPA members are leading the way.

As more information becomes available, we will continue to keep our members informed.

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⁸ Vanderklippe, Nathan. “Hydrogen Highway Hits Dead End” *FinancialPost.com*, November 5, 2007.

APPENDIX A

The New York City Alternative Taxicab Experience

New York Mayor Michael Bloomberg, in December 2007, ordered the city's entire taxi fleet be converted to alternative fuel vehicles by 2012. Bloomberg instructed the New York City Taxi and Limousine Commission (TLC), to begin a cycle of replacement that will see 20 percent of the taxicabs replaced each year until all of the city's 13,150 taxis are rated at achieving at least 30 miles per gallon on the city's streets (taxicabs beginning service in October 2008 were required to be rated at achieving at least 25 miles per gallon and in 2009, new taxis would have to be rated at achieving the 30 miles per gallon requirement). The rules also specifically permit the operation of taxicabs that are fueled only by Compressed Natural Gas if such vehicles are originally manufactured vehicles and meet other requirements of the taxicab specifications and they allowed for clean diesel. The practical result is that hybrids are about the only vehicles able to meet the new city requirement.

"Currently [April 2008], there are 1,024 hybrid taxis operating on New York's streets, about 7.8 percent of the fleet. Of those hybrids, 83 percent are Ford Escapes; the others include Toyota Highlanders and Priuses, Nissan Altimas and Lexus RX 400hs. The Toyota Prius is one of the most popular hybrids, but there are just 18 in the city's taxi fleet. Toyota said that the Prius taxis were holding up well, but that Toyota did not help to convert Priuses into taxis because they were not intended to be driven so heavily. 'Our engineers are nervous about it because they were not designed for commercial use,' said Wade Hoyt, a Toyota spokesman, who added that the company sold 270,000 hybrids last year. 'Drivers are so enthusiastic about them and they are all very popular, so we don't have to do anything to promote them.' Some drivers of hybrid taxis interviewed recently said they were mostly pleased with their cars, particularly with how much money they saved on fuel. However, they added that hybrids cost more to repair and that some of them had less space for drivers and passengers, at least compared with the roomier Ford Crown Victoria, the city's ubiquitous cab for many years."⁹

On September 8, 2008, the Metropolitan Taxicab Board of Trade (MTBOT), an association that represents about a quarter of the city's yellow cabs, filed a complaint in Manhattan's federal court, claiming that the city's plan to institute an entire fleet of "green" cabs by 2012 is unconstitutional and unsafe. The lawsuit argued that the city's decision to mandate that all new taxis, as of October 1, 2008, have a city rating of 25 miles per gallon (mpg) or more is arbitrary, because the city failed to follow its own long-standing procedures requiring safety testing and a pilot program prior to the mandate of new vehicles. The lawsuit also argued that the federal Energy Policy and Conservation Act as well as the federal Clean Air Act preempt the City's mandate. The suit asked for the October 1st mandate to be annulled. MTBOT claimed that these vehicles have not been thoroughly tested and will not hold up under the constant wear and tear to which taxis are subject. "While a decision to announce the immediate change to 'clean' taxis might be politically enticing and expedient, it is also irresponsible, dangerous and illegal," the suit said. To support their claim that the taxis are unsafe, the MTBOT submitted a declaration from a noted automotive engineer. The declaration had two appendixes.

The first – Appendix A is a *Comparative Analysis of Occupant Protection and Overall Passenger*

⁹ Belson, Ken. "The Greening of the Yellow Fleet" *The New York Times*, April 27, 2008.

and Driver Safety Between Purpose-built Commercial Yellow Taxicabs and Standard Passenger Hybrid Yellow Taxicabs in New York City. The report concludes that hybrid vehicles were unsafe as taxis and could not handle the 24-hour operation required on New York City streets. The report also concluded that some air bags in hybrids might not deploy properly once the cars are outfitted with partitions between seats meant to prevent drivers from being assaulted, robbed or killed.

The second – Appendix B is *A Sampling of Hybrid Manufacturers' Warnings* taken from the owners' manuals of a number of the hybrids approved by the Taxi and Limousine Commission. On August 29, 2008, Richard D. Emery, an attorney for the Metropolitan Taxicab Board of Trade, wrote to Nissan, Toyota, Ford, Honda, General Motors and Volkswagen requesting that they certify that their hybrids or alternative fuel vehicles are manufacturer-approved to be used as taxicabs and safe when modified with partitions and other TLC requirements. In a September 19, 2008 response to Mr. Emery, a spokesman for Honda said "Honda vehicles are not sold or recommended for use as taxicabs." However, in a July 16, 2008 industry notice informing taxi owners which vehicles they can purchase for taxi use, the TLC lists the Honda Civic Hybrid as one of nine approved vehicles for taxi use. Another automaker, Toyota, the largest manufacturer of hybrids in the world, has not responded to Mr. Emery. However, a Toyota spokesman told the *New York Times* on April 27, 2008, that "our engineers are nervous about it because they were not designed for commercial use." According to the article, "Toyota did not help convert cars into taxis because they were not intended to be driven so heavily." Still, in the July 16, 2008 TLC industry notice, the TLC lists 3 Toyotas, the Prius, Highlander and Camry on its approved vehicle list – 1/3 of all approved vehicles. Several Toyotas remain in service as New York City taxicabs. Nissan, which claims to be committing up to 200 Altima Hybrid taxicabs per month, referred Mr. Emery to a July 23, 2008 TLC letter that claims the partitions do not hinder side curtain airbag deployment. Nissan offers no crash test results on Altimas that are modified with partitions and concludes its response by stating: 'If you have an underlying concern with the mandate to use fuel efficient vehicles, this situation is a result of New York policies, not Nissan's actions.' At a September 10, 2008 New York City Council hearing, Ford Motor Company acknowledged that 'there is an increased risk for belted occupants to contact the partition in a collision' for "any vehicle with a smaller occupant space than the stretch Crown Victoria' noting that it is 'not unique to the Escape Hybrid' which indeed has much smaller occupant space than a stretch Crown Victoria. Ford refused to certify the crashworthiness of Escape Hybrid taxicabs outfitted with partitions, instead shifting responsibility to the TLC, which it says 'has an important job in making judgments that balance competing benefits and risks involving driver and customer safety in a unique operating environment.' General Motors also refused to certify the crashworthiness of its Chevy Malibu Hybrid taxicab when modified with a partition or other TLC requirements. In a letter to Mr. Emery dated September 25, 2008, GM wrote 'your client's concerns about the taxicab partitions required by the TLC should be addressed to the TLC.' To date, Volkswagen has not responded to Mr. Emery's inquiry."¹⁰

On October 31, 2008, the U.S. District Court issued a preliminary injunction, barring the city from enforcing the rules. The principal reason was that the plaintiffs were likely to prevail on their argument that when Congress enacted corporate average fuel economy ("CAFE") standards in the Energy Policy and Conservation Act of 1975 ("EPCA"), it had pre-empted state or municipal

¹⁰ Woloz, Michael. "Automakers Warn Against Using Hybrids as Taxicabs" Connelly & McLaughlin Communications, New York, NY - Press Release, October 2008.

regulations “related to fuel economy standards or average fuel economy standards for automobiles covered by an average fuel economy standard” under the EPCA. 49 U.S.C. §32919(a).

Subsequent to the judges ruling, New York City implemented a financial disincentive scheme in an attempt to get around the federal court ruling by financially encouraging all taxicab vehicles to be alternative fuel vehicles. This alternative means of implementing an alternative fuel mandate was also struck down by the federal court. The advance copy of the article that has been prepared to be published in TLPA’s August 2009 *Dispatch* newsletter is printed below.

FLEETS BEAT HYBRID VEHICLE REQUIREMENTS

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Taxi fleet owners in New York and Boston have recently prevailed against attempts by these two cities to require them to switch to hybrid vehicles.

In *Metropolitan Taxicab Board of Trade v. City of New York*, 2008 WL 4866021 (S.D.N.Y.), taxicab medallion holders, drivers, and passengers challenged a regulation issued by the New York City Taxi & Limousine Commission (“TLC”), requiring all new taxicabs placed in service after September 30, 2008 to have a federal fuel economy “city” rating of at least 25 miles per gallon, and all new taxicabs placed in service after September 30, 2009 to have a federal fuel economy “city” rating of at least 30 miles per gallon. Although the regulation did not expressly require taxicabs to have hybrid engines, in fact, only vehicles with hybrid or “clean diesel” engines could meet the standards.

The U.S. District Court issued a preliminary injunction, barring the city from enforcing the rules. The principal reason was that the plaintiffs were likely to prevail on their argument that when Congress enacted corporate average fuel economy (“CAFE”) standards in the Energy Policy and Conservation Act of 1975 (“EPCA”), it had pre-empted state or municipal regulations “related to fuel economy standards or average fuel economy standards for automobiles covered by an average fuel economy standard” under the EPCA. 49 U.S.C. §32919(a).

In response, in March 2009, the TLC withdrew the mileage-based regulation, and issued a new regulation. Under the new rule, the maximum lease fee charge for non-hybrid taxicabs is reduced by \$4 per shift in each of 2009, 2010, and 2011 (\$12, cumulatively). In addition, the maximum fee for a hybrid vehicle is increased by \$3 per shift.

The taxicab medallion holders and others challenged the new regulation, and on June 22, 2009, the court again issued a preliminary injunction prohibiting the TLC from enforcing the new rules. *Metropolitan Taxicab Board of Trade v. City of New York*, 2009 WL 1748871 (S.D.N.Y.). Because the effect of the new regulation was, as intended by the City, no different—fleet owners would have to switch to hybrid vehicles to stay in business—the court found that the new regulation was also pre-

empted by federal law, as described above. The court also found that the rules were pre-empted by the federal Clean Air Act.

Finally, on July 23, 2009, a federal court in Boston issued an oral injunction against enforcement of the city's requirement, issued in August 2008, that fleets convert to new hybrid or other fuel-efficient vehicles by 2015. The taxicab companies are apparently willing to buy used hybrid or other fuel-efficient vehicles, but not new ones. Until the judge issues a written opinion, it is difficult to know the exact rationale for his decision. However, it is probably safe to assume that his reasoning will be similar to that of the New York court. TLPA will continue to report additional developments in this case.

Editorial Note: *TLPA members should consult with their own legal counsel regarding effect of these decisions on similar regulations issued by other cities.*

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Federal Tax Credits Available for Purchasing Alternative Fuel Vehicles

The U.S. Department of Energy's Energy Efficiency and Renewable Energy Alternative Fuels and Advanced Vehicles Data Center provides a list of "State and Federal Incentives and Laws" including:

- **Alternative Fuel Excise Tax Credit** — An excise tax credit is available for alternative fuel that is sold for use or used as a fuel to operate a motor vehicle. The credit is \$0.50 per gasoline gallon equivalent (GGE) of compressed natural gas and \$0.50 per liquid gallon of liquefied petroleum gas and liquefied natural gas. The entity eligible for the credit is the one liable for reporting and paying the federal excise tax on the fuel. Eligible entities must be registered with the Internal Revenue Service (IRS). Tax-exempt entities that fuel vehicles from an on-site fueling station can claim the excise tax credit and receive a direct payment from the IRS. For more information see Publication 510 and IRS Notice 2006-92.
- **Alternative Fuel Infrastructure Tax Credit** — A tax credit is available for up to 30% of the cost of installing alternative fueling equipment, not to exceed \$30,000. Qualifying alternative fuels are natural gas, liquefied petroleum gas, hydrogen, E85, or diesel fuel blends containing a minimum of 20% biodiesel. Fueling station owners who install qualified equipment at multiple sites are allowed to use the credit towards each location. Consumers who purchase residential fueling equipment may receive a tax credit of \$1,000. The credit is effective for equipment put into service after December 31, 2005, and before December 31, 2009; the credit for hydrogen fueling property expires December 31, 2014. Form 8911 provides additional information and must be used in order to claim the tax credit.
- **Fuel Cell Motor Vehicle Tax Credit** — A tax credit of up to \$8,000 is available for the purchase of qualified light-duty fuel cell vehicles. After December 31, 2009, the credit is reduced to \$4,000. Tax credits are also available for medium- and heavy-duty fuel cell vehicles; credit amounts are based on vehicle weight. Vehicle manufacturers must follow the procedures as published in Notice 2008-33 in order to certify to the Internal Revenue Service that a vehicle meets certain requirements to claim the fuel cell vehicle credit. Notice 2008-33 also provides guidance to taxpayers about claiming the credit. Form 8910 provides additional information and must be used to claim the tax credit. This tax credit expires on December 31, 2014.
- **Biodiesel Income Tax Credit** — An entity that delivers pure, unblended biodiesel (B100) into the tank of a vehicle or uses B100 as an on-road fuel in their trade or business, may be eligible for a nonrefundable income tax credit in the amount of \$1.00 per gallon of agri-biodiesel (e.g. biodiesel made from soybean oil), or \$0.50 per gallon of pure biodiesel made from other sources (e.g. waste grease). The volumetric excise tax does not apply to the sale or use of B100. Eligible entities must have a certificate from the biodiesel (B100) producer or importer identifying the product as biodiesel or agri-biodiesel, confirming that it is properly registered as a fuel with the U.S. Environmental Protection Agency and that it meets the requirements of American Society for Testing and Materials (ASTM) specification D6751.
- **Energy Policy Act of 2005** - The Energy Policy Act of 2005 created a series of tax credits for four categories of fuel-efficient vehicles: advanced lean burn, fuel cell, alternative fuel and hybrid -- the most popular type and the one that offers the most credit opportunities. Hybrids are

Experience in Other Countries With Green Taxicabs

TLPA polled its international members and received responses from taxicab companies in Australia, Canada and England. The following is their perspective on incorporating “Green Vehicles” into taxicab fleets.

Australia

Blair Davies, CEO of the Australian Taxi Industry Association brought us up to date on the use of alternative fuel vehicles in Australia. He wrote, “The taxicab industry in Australia made a major step in ‘going green’ many years ago when most city based taxi fleets moved to operating on dedicated liquid petroleum gas (LPG) or dual LPG/gasoline-fueled vehicles. The Australian Taxi Industry Association estimates that over 15,000, or 85%, of the country’s 18,100 taxicabs currently operate on LPG. More recently, the taxicab industry has been trialing the use of gasoline/electric hybrid vehicles. Early results of these trials appear positive in terms of daily operating costs. However, it remains to be demonstrated whether such savings can adequately compensate taxi operators for the higher capital (acquisition) and repair cost associated with these vehicles.”

Mr. Davies reports that LPG or liquefied petroleum gas is the generic name used for mixtures of hydrocarbons that when lightly compressed change from a gaseous state to a liquid. Automotive-use LPG is often called Autogas (or LPG Autogas) and is specifically designed for use in vehicles. In Australia, LPG Autogas can contain both propane (C₃H₈) and butane (C₄H₁₀) with the specification (or blend) governed by the requirements of the National Fuel Quality Standards Act 2000 and the Autogas Determination 2003. The Australian taxi industry first converted to using LPG largely because it was exempt from excise tax. This resulted in LPG retail (pump) prices typically being about 50% of the equivalent gasoline price. Even after taking account of the lower energy content of LPG (approximately 77% of gasoline or diesel), running taxicabs on LPG produced significantly lower operating costs.

In addition to lowering the operating costs, LPG has the following benefits over gasoline and diesel:

- Emissions of the two most harmful vehicle pollutants (PM and NO_x) are greatly reduced.
- Net hydrocarbon emissions are ten times lower than comparable gasoline vehicles.
- Health cost impacts are much lower than diesel and gasoline.
- Greenhouse gas emissions are 12% to 14% lower than gasoline automobiles, and life-cycle greenhouse emissions are arguably lower than diesel, particularly using the latest LPG fuel management systems.

Mr. Davies states, “While the LPG taxicab fleet comprises only 2.5% of the total stock of 600,000 LPG vehicles in Australia it accounts for approximately 20% of Autogas sales. As a consequence, the Australian taxi industry has had a very significant impact on the development of LPG sales in Australia. Globally, LPG is typically used for heating and industrial purposes with less than 10% being consumed by the transport sector. However, in Australia, the widespread (and early) use of LPG by taxicabs encouraged and supported the widespread rollout of Autogas availability at retail

fuel outlets. In 2008, approximately 50% of retail fuel outlets sell LPG alongside diesel and gasoline and 60% of Australia's domestic consumption of LPG is sold to the transport sector as Autogas." Mr. Davies also reports that in rural and regional Australia, where the pricing of LPG is less competitive to gasoline due to differentially higher freight costs and inadequate competition among LPG suppliers, there has been an evident trend to use smaller engine vehicles, and more recently, to experiment with gasoline/electric hybrid vehicles. As a case in point, hybrid vehicles currently comprise approximately 20% of the taxis in smaller regional cities such as Cairns (30 of 137 taxicabs) and Townsville (25 of 131 taxicabs). Early reports from taxicab operators have been encouraging. Recently also, two State governments have demonstrated interest in promoting the use of hybrid vehicles for taxi use.

- 1) In 2007 the Western Australian Government's Department of Planning and Infrastructure announced a new initiative to introduce up to 10 hybrid vehicles into Perth's taxi fleet. Each of the participants in this 'Green Taxi Trial' will benefit from a \$15,000 government funded grant and a 20% reduction in the lease rate. Vehicles approved under this scheme must have a 5-star rating, be a new vehicle capable of seating 4 passengers, have adequate luggage space and be fitted with taxi equipment. At the moment the Toyota Prius is the only hybrid vehicle available in Australia that meets these standards.
- 2) In early 2008 the Victorian Government announced that up to 50 of the 100 'peak cabs' taxi licenses that are granted annually in Melbourne would this year be available for hybrid cars. (Peak cabs are licensed to operate between 3 p.m. and 7 a.m. every day – traveling on average 100,000 km a year.) The 'green' taxi license lease fees are offered at a special rate of \$1,136 per year instead of the \$6,136 fee, which is currently paid.

"The Australian taxi industry has been proactive in reducing its carbon footprint, originally as an early adopter, and now as a mature entrenched user of LPG in its capital and larger city based fleets," reported Mr. Davies. "This greening of the taxi industry resulted from taxi operators making prudent commercial decisions in the context of appropriately conducive market conditions (e.g. excise tax exempt pricing). Two state governments in Australia have introduced subsidy schemes to promote a limited number of gasoline/electric hybrid taxis into the market place. Such schemes are in their infancy in Australia. Concurrently, there are reasonable numbers of hybrid taxis commencing operation in rural and regional centers solely on the initiative of local taxi operators. However, it is not expected that the transition to hybrid vehicles will be an innovation without challenges. Many of these will relate to the supply of hybrid vehicles, their suitability to operate in a commercial environment (as distinct from their designed purpose for private use), as well as their reliability and service issues."

Canada

We spoke with John Palis the General Manager at Black Top Taxi in Vancouver, British Columbia. Black Top Taxi has been running Toyota Prius Hybrids since the first generation of Priuses came on line in 1999. Currently 65 of the 167 vehicles in Black Top's fleet are Priuses, 2004 – 2008 models. Mr. Palis noted that he has several 2004 Priuses with over 500,000 Km (300,000 miles). He said they have not had to replace any batteries and he spoke of great savings on maintenance on brakes and transmissions in addition to 50% fuel savings over gasoline-powered vehicles. He said that they replace brake pads on the Prius every 100,000 kilometers as opposed to every two months in their

gasoline-powered vehicles. We asked if his mechanics required specialized training to work on the Prius Hybrids and he stated that they buy their vehicles new so their Toyota dealer maintains them.

We asked if there were any drawbacks in using a vehicle the size of a Prius as a taxicab. Mr. Palis stated that the companies in Vancouver, which does not require partitions in taxicabs, had begun moving to smaller vehicles in 2000 to take advantage of better fuel and operating efficiencies. Black Top phased the last of its factory-built CNG-powered Ford Crown Vics out of their fleet in 2006. He noted that their gasoline-powered vehicles are Toyota Corollas and Toyota Siena vans that are wheelchair accessible. We asked if there were any problems at all with the Prius. He said that they had to train their drivers to avoid ‘jackrabbit starts’ since the efficiency of the vehicle comes from slowly letting the gasoline engine start the vehicle until the electric motor takes over. He said they have trained their drivers well and would highly recommend the Prius. He said there are approximately 500 Priuses in taxicab service in Vancouver and the Lower Mainland of British Columbia. Vancouver has the mildest climate of any city in Canada and is not subject to extreme hot and cold temperatures.

England

Geoffrey Riesel, Chairman of Radio Taxis Group Limited, made headlines four years ago when the Radio Taxis Group became the first carbon neutral taxi company in the world. Mr. Riesel provided the following reasons for taking this action including a description about being Carbon Neutral and what this means. “We became socially responsible transportation providers so as to move to the forefront of business in London and indeed to be leaders in the transport industry as well. Our reasons for doing this are twofold. First, to be more socially responsible and to play our own small part in trying to contribute towards a reduction in the causes of global warming. Secondly, to use our forward thinking on this subject to generate business from those clients (especially corporate clients) who were similarly concerned about corporate social responsibility. Carbon Neutral, simply put, is carbon offsetting, which is, funding projects to reduce the amount of carbon in the world to offset what you cannot help but produce as an organization. Our companies and fleets Radio Taxis, Xeta, Matrix, Executive First and One Transport, produce 24,000 metric tons of carbon every year. It is important, if a company is to become carbon neutral that it should do so through a totally reputable and verifiable agent, because carbon trading has had some harmful publicity because of disreputable agents who used double accounting.

The projects used for carbon offsetting generate emission reductions (traded as ‘carbon credits’). Standards or ‘protocols’ are used to measure the level of emissions reduction and confirm that they are real, measurable, permanent and verifiable. It is the protocol used that determines the type of carbon credit of a project e.g. “Verified Emission Reductions.” For example in one of the projects we helped to finance a Climate Cluster project which provided seed funding to a pilot solar lighting scheme for midwives in rural India. The partner in this project is SELCO and the Self Employed Women’s Association. We bought into this paying a sum for the guaranteed delivery of reductions in tons of carbon. Carbon Neutral Protocol defines the types of project that we invest in. Carbon offsetting is actually a ‘virtual’ buy and a secure audit trail is paramount. The company we use to offset is the Carbon Neutral Company. They have a very robust procedure for selecting and contracting project partners, and they maintain first class databases to record all transactions for transparency. Examples of the type of carbon saving technology, which can be funded include:

1. The technology used must be significantly different to that used locally, and the project must not be subject to any regulatory requirements
2. The offsets or carbon credits delivered have to be readily verifiable by a third party
3. The technology needs to promote a more sustainable future and we work with a number of project types to achieve that (renewables: wind, wave, solar, geothermal, benign, hydro, biomass)
4. Fuel switching / mixing to biomass
5. Transportation / logistics projects
6. Waste to energy with additional benefits (e.g. biogases combustion, animal waste combustion).
7. Energy efficiency and demand-side management

The projects we fund reduce the world's output of carbon by the same 24,000 metric tons that we produce every year."

We asked Mr. Riesel if the premise of Carbon Neutral isn't just to save Radio Taxis Group from doing anything about reducing greenhouse gases itself. Mr. Riesel responded, "The answer is no, because it encourages us to continually find ways to reduce our carbon footprint in order to make savings on our offset bill. For example, we worked hard to reduce our carbon output by changing our headquarters' electricity supply to sustainable power and by ensuring that we recycle as company policy. In the summer of 2007, Radio Taxis Group launched its own biofuel, which further reduced our carbon footprint by some 10%. We worked with Infinitum, a company who designed a biodiesel especially for us called E7. Our taxis can now fill up with E7 biodiesel to help cut carbon dioxide emissions and general pollution. Radio Taxis now offers its drivers the option of using the new 30% sustainable fuel blend, which reduces the gases the vehicles emit. It is the first biofuel to be specifically created for use in taxis and cuts CO2 by 7%. Tailpipe testing by a government-approved laboratory found the fuel cut harmful emissions. It has also led to an improvement in miles per gallon of almost 10%. Drivers have praised the way the vehicles run on this fuel. The combined impact of reduced CO2 emissions and improved mileage per gallon has cut the amount of CO2 produced by our fleet of 3,000 vehicles by approximately 3,000 tons per year."

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