

IDLING GETS YOU NOWHERE



THE HEALTH, ENVIRONMENTAL AND ECONOMIC IMPACTS OF ENGINE IDLING IN NEW YORK CITY

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finding the ways that work

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Cover photo: Mel Peffers

Figure 1: M.J. Bradley & Associates LLC, Inc. NYC Idling Model results

Figure 2: U.S. Energy Information Administration

Figures 3: M.J. Bradley & Associates LLC, Inc. NYC Idling Model results

Our mission

Environmental Defense Fund is dedicated to protecting the environmental rights of all people, including the right to clean air, clean water, healthy food and flourishing ecosystems. Guided by science, we work to create practical solutions that win lasting political, economic and social support because they are nonpartisan, cost-effective and fair.

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Executive summary

In New York City, pollution from unnecessary vehicle idling threatens public health and contributes to environmental problems like global warming. Curbside idling also wastes

Every year, unnecessary idling in New York City causes as much smog-forming pollution as 9 million large trucks driving from Hunts Point in the Bronx to Staten Island.

To absorb the global warming pollution spewed out by New York City curbside idlers, we would need to plant an area the size of Manhattan with trees every single year.

40,000 cars could drive from Midtown to JFK Airport with the gasoline wasted daily by NYC idlers.

Curbside idling costs NYC drivers over \$28 million annually in wasted fuel.*

*See Appendix C for details.

fuel and costs NYC drivers an estimated \$28 million a year. New York City's three minute idling limit laws have been on the books since 1971 but has rarely been enforced. As a result, few drivers are aware of the law, and even if they are, the chances of getting a ticket for idling are so low that it is not enough of a deterrent. Anti-idling laws are codified in NYC's Administrative Code

Sections 24-163 and 24-178 with fines ranging from \$220 to \$2,000 (with the maximum fine for third-time offenders) and the Department of Transportation's (DOT) Traffic Rules Section 4-08(p) with a fine of \$100.¹

At the end of January 2009, the New York City Council strengthened the anti-idling law codified in the Administrative Code Section 24-163 by reducing allowable idling time to one minute adjacent to schools and expanding ticketing authority to the Department of Parks and the Department of Sanitation. Currently, only the Department of Environmental Protection, the general police officers and about 100 traffic enforcement agents (TEAs) have idling ticket authority to issue idling tickets ranging from \$220 to \$2,000 under NYC's Administrative Code. In addition, the Bloomberg Administration issued draft rules that would give idling ticket authority for \$100 tickets under DOT's Traffic Rules to all 2,300 TEAs at the Police Department (NYPD).

EDF applauds these regulatory changes that will make ticketing easier. We now call on Mayor Bloomberg and the NYPD to make anti-idling enforcement a priority for TEAs. Consistent enforcement, combined with the city's public outreach campaign scheduled for this spring, will yield the best results in terms of getting the message out that NYC drivers must turn off their engines when they pull over. TEAs could give out warnings for one month before starting to ticket drivers.

We recommend designating at least 10% of TEAs to primarily focus on idling enforcement while all 2,300 TEAs should receive proper training to issue the \$100 idling tickets going forward. The TEAs who already have authority to give the much higher idling tickets ranging from \$200-\$2,000 under the Administrative Code, should be sent to idling hotspots (e.g. Port Authority, Hell's Kitchen, Time Square, black cars in front

of financial institutions, etc.) to issue the heftier fines that take into consideration second and third time offenders.²

While some may consider idling pollution and behavior just a nuisance, EDF's research shows that idling creates both unnecessary waste and harmful pollution. Working with consultants, we collected in-field idling observations for input into an idling model developed by M.J. Bradley & Associates, LLC. The model estimates the contribution of idling to vehicle pollution and fuel consumption (see Appendices for methodology). Using outputs from the idling model, along with information synthesized from published sources, this report addresses three key problems associated with idling in New York City: 1) health impacts; 2) climate impacts; and 3) economic impacts.

Health impacts. Idling is an unnecessary source of roadside air pollution, increasing the risk of health problems for all New Yorkers, including the driver of the idling vehicle. Our estimates show that idling vehicles in New York City annually produce 940 tons of smog-forming nitrogen oxides, the equivalent of 9 million large trucks driving from Hunts Point in the Bronx to Staten Island. Idling vehicles also emit 2,200 tons of smog-forming volatile organic compounds, 24 tons of soot particles and 6,400 tons of carbon monoxide each year. These pollutants are associated with a variety of health risks, including respiratory disease and impaired lung development, cancer, asthma, heart disease, lower IQ levels and prenatal complications.



Climate impacts. In addition to air pollution that harms health, our estimates show that idling cars and trucks each year produce 130,000 tons of carbon dioxide, which contributes to global warming. To offset this global warming pollution, we would need to plant an area the size of Manhattan with trees every single year.

Economic impacts. Based on an average gasoline price of \$2 per gallon and an average diesel price of \$2.50 per gallon, New York City vehicles waste approximately \$28 million³ annually in fuel by idling, or about \$43 for an average car and \$392 for an average truck. Citywide, idling wastes an average of 30,000 gallons of gasoline and 20,000 gallons of diesel *every weekday*. In addition to fuel costs, idling runs engines longer than necessary, thus contributing to wear and maintenance costs.

Solutions to help improve idling practices should focus on three key targets: enforcement agencies, individual drivers, and businesses and fleet managers.

Enforcement agencies. Strategies for reducing idling include:

- Communicate to the public anti-idling laws and make idling enforcement a priority to reduce illegal idling practices.
- Ensure all TEAs have full authority to ticket illegal idling under DOT's Traffic Rules with \$100 ticket and make it a choice on handheld ticketing device (rule pending for this). Train all 2,300 TEAs about anti-idling ticket authority. Ideally, TEAs could



also issue idling tickets under the Administrative Code 24-163 where the higher fines (\$220 - \$2,000) apply.

- Designate at least 10% of TEAs or hire additional traffic agents to focus on anti-idling enforcement under DOT's Traffic Rules (\$100 tickets) or even better under the Administrative Code (\$220-\$2,000 tickets). The regular TEAs can give tickets under the DOT Traffic Rules, which will allow for \$100 tickets for idling violations once the rule goes into effect. This will greatly facilitate public outreach about anti-idling laws and use ticketing to protect public health, reduce noise levels and global warming pollution. EDF is also urging the city that some of the approximately 100 TEAs who already have the authority to give the higher amount tickets under Administrative Code Section 24-163 (tickets between \$220-\$2,000) are designated to give idling tickets as well. Conservative estimates shows that, because idling is so prevalent, each traffic agent could raise about \$1.4 million in idling ticket revenues per year when issuing tickets at \$220.⁴
- Educate enforcement agents about the problems of idling, including municipal vehicle idling, and the importance of enforcing idling laws. Educate them about turning off their municipal vehicles' engines, even if they are exempt under the law.
- Increase signage about idling laws and penalties, especially near sensitive populations (schools, hospitals, etc.).
- Create no-idling zones in areas with sensitive populations (e.g. schools and hospitals).



Individual drivers. Many drivers do not know that idling for more than 10 seconds wastes more fuel than stopping and restarting the engine. Also, with modern technology, turning the engine off and on again no longer hurts the starter. A public education campaign that has been scheduled by the city for this spring will focus on the benefits of going idle-free. This campaign will target drivers of trucks, personal autos and car services.

Businesses and fleet managers. Reducing idling saves money on fuel, helps limit driver exposure to air pollution and improves air quality. Businesses can adopt these practices:

- Install anti-idling technologies such as auxiliary power units (APUs) and automatic engine-shutoff devices (see page 13 of this report for more information).
- Investigate financing opportunities for anti-idling technology.
- Consider addressing idling as part of an overall approach to fleet management by communicating with drivers about the health impacts of idling and new technologies to reduce it.

Introduction

New York City is the most densely populated metropolis in the nation. With so many people living, working and traveling throughout the city each day, air quality is of paramount concern. Pollution from automobiles threatens the health of New Yorkers and also contributes to global warming. Although broad policy changes are certainly needed to solve these issues, many simple steps can be taken now to simultaneously improve air quality, reduce our global warming impact and ease our collective expenditure on fuel. Reducing unnecessary vehicle idling is one of those steps.

For this analysis, idling refers to the act of running a vehicle's engine while parked, sometimes referred to as curbside idling. This also includes double-parked vehicles. This report does not address idling associated with stop and go traffic, long-duration idling of sleeper-cab equipped trucks, or long-duration job site idling of certain vocational trucks such as utility service vehicles.



Though the true extent of idling in New York City is difficult to determine, this report achieves a quantitative estimate based on available information. To do this, Environmental Defense Fund hired environmental consultant M.J. Bradley & Associates LLC to create a model that combines data from vehicle fleet compositions and emissions profiles with in-field observations and reasonable assumptions about idling behavior (see Appendices for a complete discussion of model methodology).

Using outputs from this idling model, along with information synthesized from published sources, this report addresses three key problems associated with idling in New York City: health impacts; climate impacts; and economic impacts.

Furthermore, this report addresses the variety of solutions available that could help improve idling practices. These solutions should focus on three key targets: enforcement agencies, individual drivers and businesses and fleet managers.

Policy changes for better idling practices

Sensible regulation

Although it makes smart economic and environmental sense not to idle, laws and public outreach are needed to help motivate some drivers to turn off their engines. The Mayor's office has planned a public outreach campaign on idling for this spring. Furthermore, EDF applauds the New York City Council for reducing allowable idling time to 1-minute adjacent to schools. These are great first steps that will hopefully reduce idling practices. However, EDF is urging Mayor Bloomberg to make idling enforcement a priority so that all traffic enforcement agents will consistently start handing out idling summonses, otherwise drivers will go back to their old idling habits. Eventually, we believe a 1-minute allowable idling time for all of New York City would facilitate enforcement and public awareness. The law could also allow for two tickets to be issued:

one to the driver personally and one to the company if the driver is driving a company-owned vehicle.

Often, there is the mistaken belief that idling is allowed if temperatures are below forty (40) degrees Fahrenheit. The Administrative Code Section 24-163 as well as the NYC Department of Transportation (DOT) Traffic Rules Section 4-08(p)(2) are quite clear that buses are not allowed to idle at all at a layover or terminal location (DOT determines these locations) when the ambient temperature is in excess of forty (40) degrees Fahrenheit. If ambient temperatures are below (40) degrees Fahrenheit, then buses are allowed to idle for a maximum of three minutes at the layover or terminal locations. So the law does not provide for any unlimited idling in cold or hot temperatures.

Temperature is rarely a reason to idle these days. As truckers are offered an alternative to idling that can deliver cabin heating and warm cold engines (see Chapter on different anti-idling technologies). The exemption for emergency service providers is too lenient. NYC-owned ambulances idle 24 hours a day, seven days a week because electricity is needed to operate the radio, cool medicine and charge equipment. The law should require ambulances to install auxillary power units (APUs) or additional batteries so that the engines can be turned off for at least some time of the day. Ambulances should not be stationed adjacent to schools. Furthermore, emergency vehicles should not be allowed to idle unless emergency services are being provided and shutting the engine off would compromise the delivery of services, potentially endangering health or safety. Given that these drivers are responsible for the health and safety of the community, their engines should not needlessly contribute to local air pollution and resulting health impacts.

Finally, all too often drivers leave their vehicles unattended with the engine running. This is a serious safety risk. Last month, two children died tragically in Chinatown when a driver left his van unattended with the engine running and the gear set in reverse. The van crushed the children against a building while the driver was making a delivery. Although there is a State law making it unlawful to leave an idling vehicle unattended, there should be a City law to the same extent with hefty fines that can be issued by NYPD officers and traffic agents without any observation period.⁵



Photo by Mike Lee

One of many hybrid vehicles in New York City's taxi fleet.

Leading by example

New York City vehicles should lead the way by reducing or eliminating their idling time. The Metropolitan Transportation Authority has recently ordered 850 diesel-electric hybrid transit buses. Such buses are expected to improve fuel economy by up to 30% and release just 10% of the particulate matter and 60% of the NO_x produced by older bus fleets. New regulations on New York's yellow taxis are driving a shift towards an all-hybrid fleet. This new fleet will help reduce CO₂ pollution from for-hire automobiles, which currently constitute 5.6% of the city's total CO₂ emissions from idling.⁶ With most hybrid vehicles, the engine turns off when

the vehicle is standing. However, excessive idling with heat or air conditioning on will require the gasoline engine to kick in. Clearly, New York is taking progressive steps to combat respiratory ailments from air pollution and global warming. Its commitment to its citizens and the environment must not end there.

Health impacts from idling

Poor air quality is a significant problem for the millions who live and work in New York City. The American Lung Association ranked New York the eighth-worst city for smog pollution in 2008.⁷ Smog and other pollutants are linked to health problems like asthma—a disease that afflicts New Yorkers twice as often as most Americans.⁸ The cars and trucks that clog city streets are a major source of this harmful pollution. Though regional sources like power plants and major industrial facilities also play a role, recent science has shown that air quality near major roads is often much worse than across the region as a whole. These roadside “hot spots” create an added health risk for the millions of New Yorkers who live and work near busy roadways.⁹ Idling cars and trucks are an unnecessary source of roadside pollution.

Annual pollution from idling in New York City:

- 940 tons of smog-forming NO_x: the equivalent of 9 million large trucks driving from Hunts Point in the Bronx to Staten Island
- 2,200 tons of smog-forming VOC
- 24 tons of soot (PM)
- 6,400 tons of carbon monoxide

Recent health studies on vehicle pollution

Studies have shown a wide range of health effects from vehicle pollutants. The most commonly studied illnesses have been asthma and lung disease (especially in children), and heart disease. Traffic emissions, and especially diesel soot, are widely implicated in triggering asthma attacks and impairing lung function. Some studies have found associations between traffic-related exposures and stroke; cancers, including childhood leukemia; lower IQ levels in children;¹⁰ and adverse reproductive outcomes, such as stunted fetal development, low birth weight and premature birth.¹¹ Outlined below are just a few recent findings from health researchers:

Five New York City asthma facts:

1. One out of eight New Yorkers has been diagnosed with asthma.
2. In Central Harlem, Central Brooklyn and the South Bronx, one in four children has been diagnosed with asthma; this is more than double the national average.
3. NYC asthma hospitalizations cost \$242 million to treat, in 2000.
4. In 2000, NYC children were almost twice as likely as an average U.S. child to be hospitalized because of asthma attacks.
5. Out of 3,000 counties nationwide, Queens' diesel pollution risk was the 10th worst.

(Source: NYC Dept. of Health and Mental Hygiene)

- *Childhood respiratory consequences:* Children are especially vulnerable to the effects of traffic-related air pollution; studies show increased prevalence of asthma,^{12,13} respiratory symptoms^{14,15} and stunted lung development.¹⁶

- *Cancer risks:* Higher exposure to traffic emissions was associated with increased risk of breast cancer among women in Erie and Niagara counties of New York State.¹⁷ A study in Stockholm found a 40% increase in lung cancer risk for the group with the highest average traffic-related exposure to NO₂ (nitrogen dioxide, a prevalent vehicle pollutant).¹⁸ A Danish study reported rates of Hodgkin's disease increasing by 51% in children whose mothers were exposed to higher levels of NO₂ during pregnancy.¹⁹
- *Heart disease:* A Los Angeles study found that using exposures of localized pollution levels, rather than ambient air pollution levels, can triple risk estimates of death from heart attacks.²⁰ Another study from Worcester, Massachusetts, found a 5% increased risk of acute heart attack for each kilometer closer a subject lived to a major roadway.²¹
- *Asthma and lung cancer from diesel:* Multiple studies have found serious health effects from exposure to heavy-duty diesel trucks, including increased mortality rates. Diesel emissions on busy roads have been associated with triggering asthma attacks and increased risk of lung cancer.^{22,23}
- *Lower IQ levels:* A recent study of Boston children²⁴ showed that higher levels of traffic pollution predicted decreased cognitive function on verbal and non-verbal intelligence tests—even after correcting for demographic factors, birth weight, blood lead level and tobacco smoke exposure.

Health risk from ozone (smog)

Idling vehicles put out a mix of emissions including nitrogen oxides (NO_x) and volatile organic compounds (VOCs). When NO_x and VOCs react with sunlight, they form ozone (O₃). Ozone can build up throughout the day, particularly during the long, sunny days of summer. Ozone contributes to smoggy days and is a very damaging lung irritant. Asthmatics are particularly vulnerable. Physical activity increases breathing rates and exposes people to higher levels of air pollutants, including ozone, making it riskier to exercise outdoors on high ozone days. While auto engines have become significantly cleaner throughout the years, they still emit significant amounts of NO_x and VOCs. Personal autos contribute substantially to the ozone problem in our area.

Health risk to drivers

Idling not only puts other New Yorkers at risk, it can also affect the health of the driver. A 2006 study of extended truck idling showed that all trucks cabins had some level of self-contamination from engine emissions during idling.²⁵ Truck pollution concentrations were often significantly higher inside the cab than outside with particulate matter and nitrogen dioxide concentrations sometimes exceeding U.S. EPA ambient air quality standards. Vehicle self-pollution has also been well-documented in school buses, posing a health risk to both children and drivers.²⁶ Other studies have confirmed that people with increased occupational exposure to diesel pollution, such as truck drivers, have elevated risks for health problems such as lung cancer.^{27, 28}



Photo by Isabelle Silverman

Noise pollution

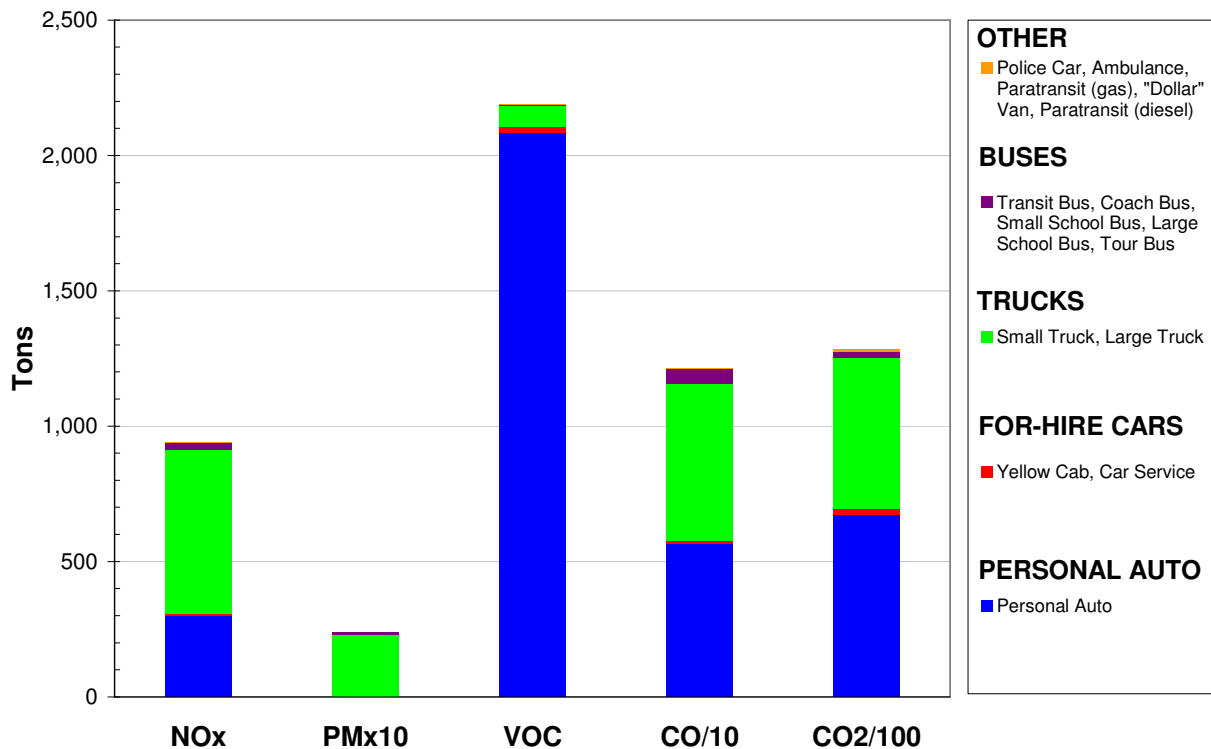
Idling vehicles, especially diesel trucks, also contribute to noise pollution. Large numbers of diesel vehicles near truck stops or delivery zones can detract from a neighborhood's aesthetic value and can raise blood pressure, heart rates and levels of stress hormones.²⁹ Several Canadian communities, such as Kingston³⁰ and Victoria³¹, have even enacted anti-idling rules as part of noise ordinance laws.

TABLE 1. Idling in New York City – What are the environmental & health impacts?

	Daily ³²	Annually ²⁶
NOx emitted (forms smog)	4 tons	940 tons
PM emitted (soot)	192 pounds	24 tons
VOC emitted (forms smog)	9 tons	2,200 tons
Carbon monoxide emitted	25 tons	6,400 tons
CO₂ emitted	510 tons	130,000 tons
Area of new trees needed to absorb CO₂ emitted	-	20,000 acres =23 Central Parks
Number of cars CO₂ emissions equivalent to	-	18,000 cars

FIGURE 1

Current ANNUAL Emissions from Idling Vehicles in New York City



Climate impacts of idling

New Yorkers face many threats from global warming, including sea level rise, heat waves, more severe weather and worsening smog (see www.fightglobalwarming.com/nyc).³³

This global problem will require large, sweeping policy solutions within the transportation sector: less driving, improved engine efficiency and low-carbon fuels. However, despite the need for these comprehensive changes, there are some solutions that can be acted upon right away. Eliminating unnecessary idling is one of many small, simple steps New York City can take immediately to lower its carbon footprint while the city pushes for long-term solutions.

Carbon dioxide (CO₂) is the main greenhouse gas that contributes to climate change. In 2005 alone, New York City was responsible for more than 58 million metric tons of CO₂. Of that, approximately 12 million tons came from cars and trucks.³⁴ Although other vehicle pollutants like NO_x and PM play a limited role in affecting the climate, improvements in engine technology (e.g. catalytic converters) have helped reduce their impact. By contrast CO₂ emissions are dependent on vehicle fuel efficiency, which has remained relatively stagnant over the past few decades due to government inaction on improving fleet efficiency rules. Our model estimates that idling vehicles in New York City emit 130,000 tons of CO₂ annually. If each of these vehicles stopped idling, that would be equivalent to taking 18,000 cars off the road annually.

Idling and global warming; the numbers:

- **130,000 tons:** The amount of CO₂ emissions caused by NYC idling per year.
- **40,000 trips:** The number of trips a car could take from Midtown to JFK Airport with the gasoline wasted daily by NYC idlers.
- **The area the size of Manhattan or 15,000 football fields:** The area of new trees needed to absorb the CO₂ emitted annually by NYC idlers.
- **18,000 cars:** NYC idling pollution is

Economic costs of idling

Not only does idling add to human health costs, but it also adds to the financial cost of driving a vehicle. Idling for more than 10 seconds wastes more fuel than turning the engine off and on.

Fueling our fuel dependency

Our analysis using the idling model developed by M.J. Bradley & Associates LLC shows that the cost of fuel wasted by idling drivers in New York City is substantial. Idling probably wastes between 0.1-0.5 gal/hr for cars and 0.39-1.65 gal/hr for trucks (see Appendix C for a full discussion fuel wasted while idling). On an average weekday, idling vehicles in New York City waste more than 30,000 gallons of gasoline and 20,000 gallons of diesel. Together, this translates into a loss of over \$28 million in fuel costs annually. On average and on a per vehicle basis, idling cars waste about \$44 annually while idling trucks waste about \$392 annually. Not only does wasting fuel cost individual drivers, it also increases our nation's demand for oil and perpetuates higher prices at the pump. With transportation accounting for nearly two-

Idling in New York City:

- **wastes more than 7 million gallons** of gasoline and 5 million gallons of diesel annually
- **costs drivers \$28 million** in wasted fuel annually

[Source: M.J. Bradley & Associates LLC.]

thirds of all the oil used in the United States,³⁵ reducing idling is a simple step individuals can take towards reducing our nation's oil dependence.

FIGURE 2
Fuel prices in the United States (U.S. Energy Information Agency)

Retail Fuel Prices

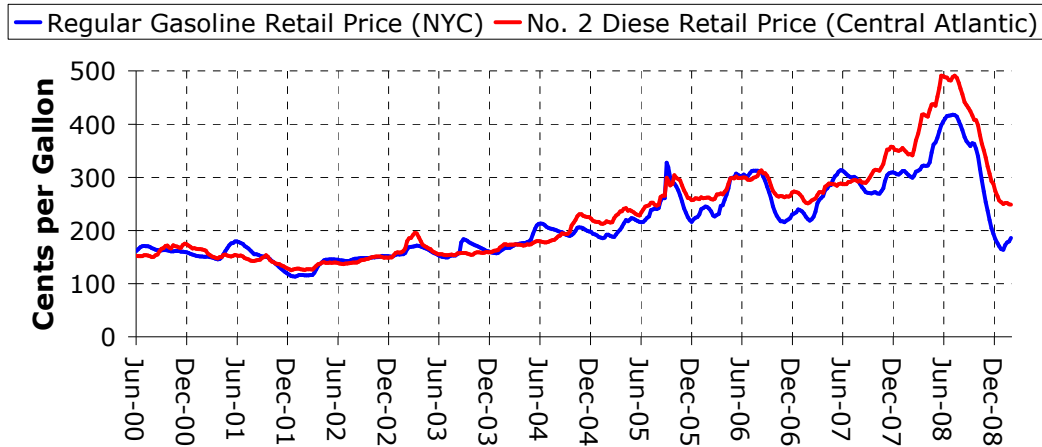


TABLE 2. Idling in New York City – What are the costs?

	Average weekday	Annually
Time spent	347,000 hours	87 million hours
Gasoline wasted	30,000 gallons	7.5 million gallons
Diesel wasted	20,000 gallons	5.2 million gallons
	Average weekday	Annually
Money wasted		
Total:	\$213,000	\$28 million
Per car:	-	\$44
Per truck:	-	\$392
Distance a car could drive using gasoline wasted	686,000 miles =28 trips around the world	171 million miles =722 trips to the moon and back

Maintenance costs

Based on interviews with drivers, it appears that many commonly misunderstood facts persist about idling and vehicle maintenance costs. Idling a vehicle keeps the engine running, and thus contributes to normal engine wear; however some drivers believe idling is better for their engines than stopping and restarting. These beliefs may have held more truth in past years, but with improvements in vehicle technology, idling is no longer a beneficial practice. A study also found that battery and starter wear costs about 1-2 cents

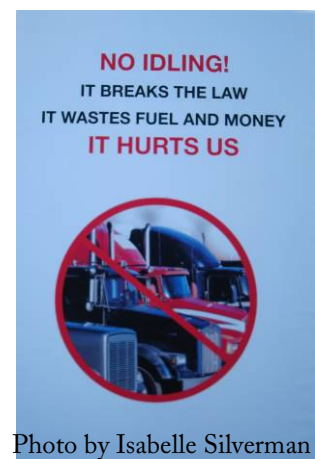


Photo by Isabelle Silverman

per restart.³⁶ By this measure, an additional two restarts daily would cost about \$10 extra per year compared to idling which could cost more than \$44-\$392 depending on fuel prices, idling habits and vehicle type.

Solutions for reducing idling

A city-wide approach to reducing idling should include a combination of better enforcement, outreach to individual drivers and sharing successful business and truck fleet strategies. Eventually, a one minute idling restriction across NYC, would help enforcement and clarity among drivers as to how long the allowable idling time is. Once the one minute rule adjacent to schools has been well established, we urge City Council to change the law to one minute for all of NYC.

Enforcement of anti-idling laws



Although there is no federal law on idling, 31 states and dozens of municipalities have enacted anti-idling laws. New York City's laws limiting idling to one minute adjacent to schools and three minutes are among the nation's most stringent.³⁷ Unfortunately, the law is not adequately enforced. EDF is urging Mayor Bloomberg and NYPD to start enforcing the law consistently so that NYC drivers get the message that idling is no longer an acceptable practice. Once drivers learn about the law and know about the risk of getting a ticket by NYPD's traffic enforcement agents (TEAs) or by other agencies, most of them will probably turn off their engines.³⁸ Below is a list of suggested measures New York City could take to improve the effectiveness of its existing idling laws:

1. Ensure that all TEAs get full ticket authority for illegal idling under DOT's Traffic Rules Section 4-08(p)³⁹ for \$100 tickets (a Department of Finance rule is pending for this). Right now, only general police officers have anti-idling enforcement authority, but most of their time is focused on crime fighting. TEAs already patrol the streets and are in an ideal position to observe illegal idling behavior. It is also the traffic agents' health that gets affected most by illegal idling. Ideally, all TEAs should be able to issue the higher fines (\$220-\$2,000) under the Administrative Code.
2. Designate or hire a certain number of TEAs to focus on issuing anti-idling tickets. Because idling is extremely prevalent in New York City, we have estimated that each

Current fines for idling violations if ticket issued under NYC Administrative Code Sections 24-163 and 24-178 (returnable to Environmental Control Board):

- 1st offense: \$220 - \$1,000
- 2nd offense: \$330 - \$1,500
- 3rd offense: \$440 - \$2,000

Proposed fine for idling violations if ticket issued under DOT's Traffic Rules Section 4-08(p) (returnable to Dept. of Finance) :

- always \$100

Exceptions: emergency vehicles and vehicles loading/unloading

TEA could issue an average of 4-6 idling tickets per hour at \$220 per ticket, which adds up to \$1.4-\$2.1 million in ticket revenues per officer per year. This is probably a conservative estimate since \$220 is merely the minimum fine under the Administrative Code while tickets can cost up to \$2,000 for repeat offenders. Our calculations are based on a seven-hour work day, four weeks of vacation or sick days and a maximum of 10 lost work days for testifying in court if idling tickets get challenged.⁴⁰

3. Currently, only about 100 TEAs can issue idling tickets (ranging from \$200-\$2,000) under the NYC Administrative Code Sections 24-163 and 24-178 returnable to the Environmental Control Board (ECB). We recommend that at least some of the TEAs with authority to issue the higher tickets under the Administrative Code are designated to focus on anti-idling enforcement in hotspots areas (e.g. Port Authority, Hell's Kitchen, Times Square, in front of financial institutions, etc.).
4. Because issuing idling tickets can be confrontational when the driver is in the car, we recommend pairing up TEAs. Enforcement of this law means real revenues for the city and will quickly educate drivers about the law. If the idling laws were changed to one-minute allowable idling time for all of NYC, enforcement would be even more efficient.
5. Work with precincts to help police officers understand the problems caused by idling and properly train them to identify and ticket illegal idling.
6. Facilitate issuance of idling tickets so that officers have an incentive to spend the 1-3 minutes observing. For example, idling could be included high on the list of traffic offenses on hand-held ticketing devices.
7. Increase signage about idling laws and penalties. Signs should target specific areas such as schools, hospitals, hotels, gas stations and delivery zones.
8. Create no-idling zones in areas with sensitive populations (e.g. schools and hospitals).



Individual drivers: Targeting trucks and personal autos for maximum effectiveness

Our analysis shows that idling pollution comes primarily from two vehicle types: trucks and personal autos. As Figure 2 illustrates, VOC emissions (a precursor to smog) come mainly from personal automobiles, while particulate (soot) emissions come largely from trucks. Meanwhile, NO_x (another smog precursor), carbon monoxide (CO) and carbon dioxide (CO₂) are split between these two groups. Thus, efforts to reduce idling should include public outreach and education that specifically targets both personal autos and trucks.

Driving smart: FAQs about idling

Q: Do car engines need time to warm up during the winter?

A: Today's electronic engines do not need idling to warm up before being operated. The best way to warm the engine is by easing into your drive and avoiding excessive revving. The vehicle's engine warms twice as quickly if driven instead of idled. Easing a vehicle into a drive will also speed up warming or cooling of the cabin's interior.

Q: Does stopping and restarting an engine burn more fuel than idling?

A: No. Engine studies have shown that idling for more than approximately ten seconds burns more fuel than stopping and restarting (Emissions Research and Measurement Division, Environment Canada, 2000). An idling large diesel truck will burn approximately a gallon of fuel an hour (U.S. EPA, EPA420-B-04-001, 2004).

Q: Are frequent restarts hard on the car's engine and battery?

A: Whereas batteries in the past may have faced a relatively short lifespan, today's batteries last longer, use less power during ignition and recharge more quickly. A definitive study found that battery and starter wear costs about 1-2¢ per restart (Office of Energy Efficiency, Natural Resources Canada, 2003). Thus an additional 2 restarts daily would cost an extra \$10 per year. This can be compared to the fuel wasted by an idling New York City vehicle, which can cost up to \$44-\$392 per year depending on fuel prices, idling habits and vehicle type.

Communication channels

Advertising can play a critical role in public education. Banners, signs and posters could be used to remind drivers to shut off their engines. Ideally, information and signage could be posted in public areas such as schools, hospitals, hotels, gasoline stations and truck delivery zones. A more ambitious campaign might incorporate direct personal contact; volunteers or workers could patrol streets to inform drivers of the dangers of idling and educate them about anti-idling laws.

Schools can also provide a simple and effective way to disseminate information. Participating teachers could distribute anti-idling toolkits, complete with design-your-own vehicle decals, brochures, stickers, bookmarks and informational cards to their students. Children would be encouraged to share such information with their parents or guardians. This approach could have a great impact in reducing idling, especially near school zones. The success of this program would depend on positive communication and reinforcement among school administrators, teachers and organizing groups.

Under the new law, private schools will need to put up signs to make the 1-minute idling restriction applicable to their school grounds.

Best practices for businesses and fleet managers

Businesses and fleet managers can turn to a variety of solutions to reduce idling. Many technologies exist to power auxiliary vehicle equipment (e.g. heating and cooling) without running the engine. Changing driver routes and reducing left-hand turns are also ways to minimize in-traffic idling and improve fuel economy and safety. The success of all these solutions depends on proper management support and driver education.

Anti-idling technologies

Whereas turning off the engine is the quickest, most effective way to cut fuel costs and reduce pollution from idling, a number of anti-idling technologies provide alternatives for instances when auxiliary power is needed. Although each of these devices requires an initial investment, they can help businesses and truck fleets save money in the long run through reduced fuel and maintenance costs:



Photo by IdleAire, Inc.

- **Engine shutdown and restart:** Sensor devices can signal the engine to shut down when in idling conditions. The most common devices work on a timer, though some use innovative designs like motion sensors.
- **Supplementary diesel heat:** Various devices can supply heat to diesel engines without requiring the engine to burn fuel.
- **Block heater:** Installing an electric-powered device to prewarm the engine and ease starting in cold weather is an effective method for reducing idling and allowing heat to be delivered in the cabin sooner than driving from a cold start.
- **Grid power systems:** Plug-in power systems can be installed as a source of electricity instead of idling.
- **Truckstop electrification (TSE):** A network of electric power setups for truckers is growing across the nation. TSEs provide window devices that can deliver a variety of services including heating and air conditioning, 120 VAC power for appliances and entertainment services (e.g., Internet, television). There is a one-time cost for the window panel and an hourly plug-in charge.
- **Electric-driven auxiliaries:** Battery or electricity-powered secondary (auxiliary) engines can be used to generate enough energy to power some devices on a vehicle without running the engine. A special type of plug-in system for refrigeration and freezer trucks called “reefers” is available; however, it is not as widely used here as it is in Europe because of the lack of infrastructure and locations.
- **Generator sets (GenSets) and auxiliary power units (APUs):** Both GenSets and APUs use the diesel engine to charge the generator. Such devices can consume less than one-eighth the amount of fuel of an idling truck engine and cost around

\$8,000.⁴¹ The use of auxiliary engines is particularly effective on trucks needing heating, cooling, lighting or lifting power.

- If extra electricity is needed such as for cooling of medicine and charging equipment like ambulances typically need, we recommend adding one or two extra batteries so that the engine can be turned off while the batteries support the equipment that needs charging or cooling. A mechanism could send a signal to the engine when the batteries are drained so that the engine would turn on. Excessive heating or cooling of the ambulance/vehicle would drain the batteries much faster and should be avoided.
- **Supplementary air conditioning:** Systems like Webasto Products' BlueCool can cool truck cabins without the need for idling. While the trucker is driving, the engine sends refrigerant to the unit to create blocks of ice. Once stopped, an air handler then blows cold air back into the truck cabin, using only 3.5 to 10 amps from the truck's battery.
- For more detailed information about pay-back periods and the different idling reduction technologies, go to the Argonne, National Laboratory webpage for the following three documents:
 - Which Idling Reduction Technologies Are the Best? See Argonne webpage at: <http://www.transportation.anl.gov/pdfs/EE/533.pdf>
 - Economic Analysis of Commercial Idling Reduction Technologies. See Argonne webpage at <http://www.transportation.anl.gov/pdfs/TA/372.pdf>
 - Modeling Idling Reduction Options for Heavy-Duty Diesel Trucks. See Argonne webpage at <http://www.transportation.anl.gov/pdfs/TA/397.pdf>

Improved financing mechanisms

Though anti-idling idling technologies can achieve long-term cost savings, high upfront costs often deter investment. Improved financing options and tax incentives could help small fleet owners overcome this barrier to installing anti-idling equipment. There are some financing options for anti-idling technology available through federal programs such as the EPA's SmartWay Partnership and Voluntary Diesel Retrofit program. However, these generally focus on long-haul sleeper cabs and are not tailored to the specific needs of New York City. The New York State Energy Research and Development Authority (NYSERDA) also has a program to encourage truck-stop electrification but again this generally applies to upstate interstate corridors, not the urban environment. City and state agencies such as NYSERDA or the Port Authority of NY & NJ should consider expanding and supplementing federal incentive programs by offering low-interest loans or performance contracting agreements with truck fleets that use anti-idling technologies locally. Many anti-idling technologies have relatively short payback periods, offering a solution that can be economically and environmentally attractive.

Smart fleet management

In a fleet context, understanding drivers' idling needs is important. Suggesting that drivers should not idle, without explaining the benefits or providing a reasonable alternative could be perceived as unfair and might meet resistance. Fleet managers should

be responsible for properly educating their drivers about legal idling practices and the harm caused by illegal idling. Drivers unfamiliar with new anti-idling technologies should be able to test the equipment before having it installed. Industry experience has shown many anti-idling technologies are received favorably by drivers when given the opportunity to test them. Fleet managers could also consider monitoring driver performance. With the use of onboard computers, fleet managers are now able to record idling time for each driver and could use this information to reward drivers who idle least.

Most importantly, fleet managers can evaluate what anti-idling technologies would work best for their company's needs. Investing in the right equipment to encourage idle-free behavior (e.g. TSE accounts) and prevent unintentional idling (e.g. switch-off devices) makes sense from both a cost-benefit and occupational health perspective.

Spotlight on corporate approaches

Many fleets have successfully incorporated anti-idling technologies or features in their trucks. Small and large companies alike are searching for anti-idling methods and devices to help achieve better fuel savings. In addition, federal programs are available to help companies commit to cleaning up tailpipe emissions.



SmartWay

Numerous fleets have joined EPA's SmartWay Partnership. The voluntary partnership creates financial incentives for increasing fuel efficiency and lowering greenhouse gas emissions. For instance, SmartWay works with banks and state governments to establish improved financing options

that allow participating firms to pollute less while maintaining or improving profit margins. Reducing engine idling is one of the three primary components of the program; EPA seeks to create a nationwide network of idle-reduction technologies along the country's biggest highways.

Wal-Mart

Wal-Mart has outfitted its 7,000-vehicle truck fleet with auxiliary power units (APUs). Despite the seemingly high capital cost, Wal-Mart estimates an 18-month payback period due to fuel and engine wear savings. Wal-Mart's fleet drivers seem to be more than satisfied with this transition; the overwhelming majority prefers the APU to provide heat and cooling over the noise and pollution from engine idling.



Smithfield Transportation Company, Inc.



Smithfield Transportation is a subsidiary of Smithfield Corporation, a national grocery store headquartered in Virginia. In an effort to reduce

idling and cut costs, Smithfield installed 150 APUs on its truck fleet. Although this large capital undertaking cost the company a total of \$750,000, Smithfield experienced a rapid payback on its initial investment. Smithfield's anti-idling effort does not stop at APUs. The company monitors its trucks with on-board computers to ensure the technology is being used properly. In addition, Smithfield holds quarterly training sessions on safety and compliance. Smithfield enjoys significant benefits from its anti-idling activities and saves an estimated \$54,000 a month in fuel. Moreover, the company recognizes that idling is the most strenuous stage for the components of a diesel engine. The savings in engine wear allow for higher resale value on trucking fleets. Before Smithfield installed APUs, it considered ten different devices and allowed drivers to select the one they liked best.

Sharp Electrical Corporation

The Sharp Electrical Corporation has instituted a "zero-idle" policy at its headquarters in New Jersey and has posted several signs on its premises to inform drivers of the rule. Although Sharp does not operate its own fleet, it does give drivers an alternative to idling. The firm provides a breakroom for drivers, reducing the need for them to spend time in a temperature-controlled cabin. Even though compliance is not 100%, Sharp is actively working to engage drivers and reduce their idling practices through both communication and enforcement.

The logo for Sharp Electrical Corporation, featuring the word "SHARP" in a bold, red, sans-serif font.

Jones Brother Trucking, Inc.

The logo for Jones Brother Trucking, Inc., featuring the words "JONES BROS TRUCKING" in a blue, stylized font. "JONES" is the largest, followed by "BROS" and "TRUCKING" below it.

Jones Brother Trucking is headquartered in Montana and operates primarily in the West. Given its location, cabin temperature for its fleet drivers is a prime concern, and Jones Brother Trucking uses cabin heaters to address this problem. During the winter, such technology results in an 80–90% reduction in idling. By shutting off the diesel engines, the fleet avoids prematurely wearing down fuel injectors. In addition, the company has an education program to train drivers in using the technology.

Spotlight on New York City school buses

Given that children are particularly vulnerable to pollution from idling, extra attention must be paid to school zones and bus fleets. Idling buses exacerbate existing health conditions among children, prompting higher absenteeism rates. In fact, a study by the New York State Attorney General's office in 2003 found that despite the three-minute idling law, many school buses were idling for more than 20 minutes, spewing diesel exhaust around public school grounds. In 2004, former Attorney General Eliot Spitzer sued five school bus companies for breaking the idling law. The lawsuit resulted in a settlement agreement with the bus companies agreeing to reduce idling time to no more than one minute. Spitzer's office estimated that idling by the four school bus companies resulted in annual emissions of approximately 1.3 tons of particulate matter, 60 tons of nitrogen oxides and 20 tons of carbon monoxide in the metropolitan region.

In 2007, New York State passed a law minimizing school bus idling in front of schools. For more details, see <http://www.ny.gov/governor/press/0907072.html>



Conclusion

Unnecessary idling is wasteful. More importantly, pollution from idling harms the health of drivers and the public. Both voluntary and regulatory approaches are needed to solve the idling problem. Stepping up enforcement would greatly help inform the public about NYC's anti-idling laws and generate substantial revenues for the city, depending on how many traffic agents will be designated to enforce anti-idling laws. Changing the law to a 1-minute allowable idling time for all of NYC, would facilitate enforcement and public education. Technological, management and policy solutions exist. Leadership is needed to champion idle-free behavior. The message to the public should be: "when you pull over, turn off your engine right away." Everyone has something to gain by reducing needless idling.

Appendix A: Model methodology

The idling model used to determine health, environmental, and economic impacts of idling in New York City calculates estimated daily idling emissions from various groups of vehicles as follows:

$$\text{Emissions (tons)} = \text{Number of Vehicles in use} \times \% \text{ of vehicles that idle} \times \text{Average Idling Time/vehicle (minutes)} \times \text{Emissions Factor (g/min)} \div 908,000 \text{ (g/ton)}$$

The vehicle types included in the model are: personal autos, yellow cabs, car service cars, police cars, ambulances, paratransit vans, “dollar” vans, small trucks, large trucks, transit buses, coach/tour buses, and small/large school buses.

Data on the number of vehicles of each type in use in New York City was gathered from various sources, including the NYC Taxi and Limousine Commission, *List of Current Licensees* (yellow cabs, car service cars, medical paratransit); The New York Metropolitan Transportation Council, *2005 Regional Transportation Statistical Report* and *2005 Hub-bound Travel Report* (personal autos, small and large trucks, coach buses); MTA New York City Transit (transit buses, paratransit vehicles), and the NYC Department of Education (school buses). For personal autos, as well as small and large trucks, the number of vehicles assumed to be in use each day was one half of the average annual daily traffic volume across all major river crossings into NYC. Based on the truck type distribution observed at MTA Bridges and Tunnels in 2006, 75% of total truck volume was assumed to be small trucks and 25% was assumed to be large trucks (five-plus axles).

For all vehicle types, gram per mile idling emissions factors for nitrogen oxides (NO_x), particulate matter (PM), carbon monoxide (CO), volatile organic carbon (VOC), and carbon dioxide (CO₂) were extracted from U.S. EPA’s MOBILE6.2 vehicle emissions model. Separate emissions factors were used for different vehicle model year ranges, based on significant changes in EPA emission standards. The model year bins used for cars and light trucks were: pre 1994, 1994 – 2003, and 2004 and newer. The model year bins used for heavy duty trucks and buses were: pre 1998, 1998 – 2002, 2003 – 2006, and 2007 and newer. For yellow cabs, car service cars, and medical paratransit vehicles the actual model year distribution of the NYC fleet was used, based on licensing records. For other vehicle types the average model year distribution of the entire U.S. fleet was used, based on data from the U.S. Department of Energy, *Transportation Energy Data Book, Edition 26*. To calculate annual emissions, daily emissions were multiplied by 250 days per year for all vehicle types except for taxis (365 days per year) and school buses (200 days year).

Appendix B: Idling observations

Assumptions about the percentage of vehicles in use that idle each day, and average idling time per vehicle, were based on idling observations conducted at various locations around New York City. Our consultants observed 486 occurrences of vehicles idling during 120 hours of idling observations at more than 50 locations in New York City. During these observations the consultant would typically spend one to two hours at a single street corner and record all vehicles observed to be parked, noting the engine on and off times for those observed to be idling while parked. Based on these observations we assumed that 30% of all vehicles in use each day idle (all vehicle types). Idling observations range from a low of 2 minutes to a high of 134 minutes. Average observed idling times and assumed incidents per day that were used as model inputs are shown in Table A-1 below.

TABLE A-1. **Idling Observations and Assumptions Used in NYC Model**

Vehicle Type	Avg Idling Time	Assumed idling incidents per day
Personal Auto	0:16:08	2
Car Service	0:08:48	5
Taxi	0:08:02	3
Ambulance*	0:14:06	3
Cargo Van	0:20:57	3
Municipal Vehicle	0:06:38	3
Small Truck	0:34:50	5
Large Truck	0:23:48	5
Para Transit	0:11:37	4
School Bus	0:02:39	3
Transit Bus	0:05:03	3
Coach Bus	0:09:14	3
Utility Vehicle	0:16:04	3
Small Bus	0:14:16	3

* The city-owned ambulances typically idle 24 hours a day, 7 days a week.

Appendix C: Fuel wasted while idling

Fuel cost estimates throughout this report were made based on gasoline and diesel prices at \$2.00 per gallon and \$2.50 per gallon respectively.

Daily fuel use by idling vehicles was calculated based on the estimated idling emissions of CO₂, and assuming that 8,482 grams of CO₂ are released by burning one gallon of gasoline and that 10,272 grams of CO₂ are released by burning one gallon of diesel fuel. CO₂ emissions were in turn based on the EPA's MOBILE6.2 emissions model as described in Appendix A. The CO₂ emissions factors from this model imply that the "average" car burns 0.11 gal/hr of fuel while idling. This is relatively low compared to other data, and is thus a conservative estimate. For example, AAA New York claims that idling burns approximately a gallon of gas per hour,⁴² and a Natural Resources Canada report shows approximately 0.48 gallons (1.8 liters) per hour.⁴³

The idling CO₂ emissions factor from MOBILE6.2 that we used for large trucks implies fuel use of 0.37 gal/hr while idling, which is also a conservative estimate based on additional research conducted by M.J. Bradley & Associates LLC. Research shows that a large truck burns 1 gallon of diesel fuel for each hour of idling and even more if the heat or air-conditioning is on.

EPA testing has shown a fairly wide range of actual idling fuel use by Class 8 trucks – from a high of 1.65 gal/hr to a low of 0.39 gal/hr. However, most of the high values were obtained at "high idle," which is often used when operating auxiliary engine loads (e.g. air conditioning or heating). The average of the EPA tests for "normal idle" was 0.58 gal/hr. Also, all of these tests were conducted on sleeper-cab equipped trucks under three conditions: 95 deg. F with A/C on; 65 deg. F without auxiliaries; and 0 deg F with heat on. As expected, in all cases fuel use was lower without the auxiliaries on, and the average noted above was for all tests.

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- ¹ Administrative Code Section 24-163, see http://24.97.137.100/nyc/adcode/title24_24-163.asp and Section 24-178 and Section 24-178 for penalties for tickets returnable to the Environmental Control Board (ECB), see http://24.97.137.100/nyc/adcode/title24_24-178.asp (these summonses can only be issued by the Dept. of Environmental Protection, the general police officers at NYPD and about 100 Traffic Enforcement Agents at NYPD. The tickets issued under the Administrative Code, returnable to the ECB range from \$220-\$2,000 for third time offenders. See Administrative Code Section 24-178 for details. NYC Dept. of Transportation's Traffic Rules, Section 4-08(p) also contains the 3-minute idling rule, see <http://www.nyc.gov/html/dot/downloads/pdf/trafrule.pdf>. Under the NYC Dept. of Finance Proposed Rules Relating to Parking Violations, all Traffic Enforcement Agents will be able to issue idling tickets under the Dept. of Transportation's Traffic Rules, Section 4-08(p) in the amount of \$100 only.
- ² See Endnote 1.
- ³ See Appendix C which shows that this report based its calculation for wasted fuel on very low estimates on how much gasoline and diesel is wasted while idling.
- ⁴ Our calculations are as follows for 4 tickets per hour (1-3 minutes of observation and 12 minutes to issue ticket and move on to next vehicle): At \$220 per ticket and a 7 hour workday, that is \$6,160 in ticket revenues per officer per day and \$30,800 per week per officer. 48 work weeks minus two weeks of time used to testify in court when people challenge tickets, leads to 46 weeks of issuing tickets which is a total of \$1.4 million in ticket revenues per officer per year. The revenues would be \$2.1 million in ticket revenues per officer per year if an officer gives 6 tickets per hour. \$220 tickets to \$2,000 ticket can only be issued by TEAs that have the authority to give ECB tickets returnable to ECB under the NYC Admin. Code Sect. 24-163.
- ⁵ NYS Vehicle and Traffic Law, Title 7 - RULES OF THE ROAD, Article 33 - (1210 - 1229-D) MISCELLANEOUS RULES: According to New York State Vehicle and Traffic Law 1210, "No person driving or in charge of a motor vehicle shall permit it to stand unattended without first stopping the engine, locking the ignition, removing the key from the vehicle, and effectively setting the brake." See <http://ypdcrime.com/vt/article33.htm>.
- ⁶ Taken from IHS news article available at <http://auto.ihs.com/news/2008/nyc-hybrid-buses.htm>
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weeks of issuing tickets which is a total of \$2.1 million in ticket revenues per officer per year. The revenues would be \$3.5 million in ticket revenues per officer per year if an officer gives 10 tickets per hour.

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