TORONTO

STAFF REPORT
ACTION REQUIRED

Feasibility of Mandatory Installation of Idle Reduction Technologies

Date:	June 13, 2008
To:	Board of Health
From:	Medical Officer of Health
Wards:	All
Reference Number:	

SUMMARY

Vehicle idling is a preventable source of air pollution. This report responds to the Board of Health's request to report on the availability of anti-idling technologies and the feasibility of phasing-in mandatory installation of such technology for motor vehicles operating in the City of Toronto.

Available idle-reduction technologies range from technologies designed to monitor idling behaviour to those that can be installed in the vehicle or in parking and rest stops. Some issues that affect the feasibility of their mandatory installation include cost, jurisdictional authority, driver preferences, and suitability for specific applications. Fleet Services is already using and testing various idle-reduction technologies and the Toronto Transit Commission and Fleet Services use hybrid vehicles which reduce idling in traffic.

Education, evaluation, and written policies are key to idle reduction strategies. Adoption of idle-reduction technologies by businesses has likely been limited by lack of awareness about available technologies and their potential pay-back over time by reducing fuel consumption. Public Health, Transportation Services, Fleet Services, and the Toronto Transit Commission already conduct some public education. Reducing the permitted idling time in the City's Idling Control Bylaw from three minutes to ten seconds would help promote the message that idling is unnecessary, and aid enforcement and contribute to a reduction of traffic related air pollution. The feasibility of amending the current municipal bylaw to reduce permitted idling from three minutes to ten seconds should be investigated.

RECOMMENDATIONS

The Medical Officer of Health recommends that:

1. the Board of Health request the Federal Minister of Transport, Infrastructure and Communities, in collaboration with Ontario's Minister of Transportation to mandate idle-reduction technologies in new vehicles and promote idle-reduction; and

2. the Board of Health request the Medical Officer of Health in collaboration with the General Manager of Transportation Services to report on the implications of amending the City's Idling Control Bylaw to reduce permitted idling from three minutes to ten seconds

Financial Impact

There are no financial implications arising from this report.

DECISION HISTORY

At its November 12, 2007 meeting, the Toronto Board of Health received the report, *Air Pollution Burden of Illness from Traffic* which estimated the health and economic impacts of traffic-related pollution. The Board requested the Medical Officer of Health to report on the availability of anti-idling technologies and feasibility of phasing-in mandatory installation of such technology for all motor vehicle fleets operating in the City of Toronto.

ISSUE BACKGROUND

Traffic-related pollution is responsible for significant health and economic impacts in Toronto. In November 2007, Toronto Public Health estimated that exposure to traffic pollution gives rise to approximately 440 premature deaths and 1,700 hospitalizations per year in Toronto. Mortality-related costs associated with traffic pollution in Toronto were estimated to be about $2.2 billion each year. Idling is an important contributor to traffic-related pollution. Efforts to reduce idling could improve local air quality and reduce health impacts of air pollution from traffic.

This report has been prepared in consultation with Transportation Services, Fleet Services, Toronto Transit Commission, and Legal Services.

COMMENTS

Idling occurs when a vehicle engine is operated but the engine is not in gear. Vehicles idle for many reasons. Vehicles idle to warm up the engine and to provide heat or air conditioning. Heavy-duty trucks typically idle their engines during rest periods such as overnight stops, and to provide temperature control and electricity for devices such as a television or refrigerator. Municipal vehicles may idle their engines in order to power auxiliary equipment, including safety lights and aerial lifts. Some drivers idle unnecessarily out of habit or convenience (e.g. while waiting for a passenger). Idling occurs in many places including roadways, truck stops and rest areas, bus terminals, restaurant drive-throughs, tourist attractions, border crossings, company terminals or distribution centres, and schools.

Vehicle idling has negative health and environmental impacts. Idling is a source of pollutants such as nitrogen oxides and particulate matter that are known to affect cardiovascular and respiratory health. Vehicle exhaust also contains air toxics such as formaldehyde and trace metals that have been linked to cancer and other chronic illnesses. Studies show that the levels of vehicle-related pollutants are higher in places where idling is common, such as rest stops, bus stops, and near schools. These emissions affect both the driver and people exposed to emissions. Some people also view the sound of idling trucks as unwelcome noise pollution.

Idling is also a source of greenhouse gases, which contribute to climate change. Climate change is expected to increase the frequency of very hot days in Toronto, leading to more heat-related illness and mortality, and worsening the effects of air pollution. According to Natural Resources Canada, if every Canadian reduced their idling by 5 minutes per day, 1.6 million tonnes of GHG emissions would be avoided each year in the country.

Idling is economically costly as well – the Clean Air Partnership estimates that idling wastes 90 million litres of fuel worth over $70 million each year in the Greater Toronto Area. Running the engine also increases engine wear. For heavy-duty vehicles, this means that preventive maintenance and costly engine rebuilds must be done more often.

Technologies to Reduce Idling in Vehicles

Anti-idling, or idle reduction, describes strategies and technologies that eliminate or reduce the amount of time vehicles idle their engines.

Reducing vehicle idling time

Several technologies have been developed to reduce the amount of time vehicles spend idling. Automatic shut-down/start-up devices can switch parked engines off or on after a predetermined time limit, such as the local legal idling limit. They can also be programmed to shut off when the vehicle interior reaches a target temperature (similar to a home thermostat).

In certain types of vehicles, such as emergency vehicles, idling is needed to power equipment such as lights and tools. In these vehicles, using more energy-efficient equipment can reduce the need to idle. For example, low wattage lights, such as light emitting diodes (LEDs) can be mounted on vehicles. LEDs use substantially less power than bulbs in standard warning and emergency lights. Most of the time, they draw power from the engine battery. When the energy level gets low, a horn sounds and the driver restarts the vehicle to recharge the battery.

Remote ignition controls can be used for fleet vehicles that have an aerial bucket such as those used for tree and electrical wire maintenance. A remote ignition allows the operator to shut the engine on and off whenever they need to move the aerial bucket so they do not have to have the engine running for the duration of their work.

Electronic vehicle monitoring systems track the amount of time spent idling and where idling occurs. Electronic monitoring systems are valuable education awareness tools, as drivers may be unaware of the amount of time they idle their vehicles. Some managers of major fleet services currently use this information to track idling in their drivers. For example, Molson Canada monitors idling in its vehicles and produces daily and weekly reports, with the results communicated to drivers to discourage idling. This is used in conjunction with their anti-idling policy to minimize idling in their fleet.

Hybrid technologies can also reduce the amount of time vehicles spend idling in traffic. Hybrid vehicles have both batteries and fuel engines, and can often rely on the batteries alone when the vehicle is stopped.

Eliminating idling

Some technologies eliminate the need to idle altogether. Auxiliary power units use fuel directly from the tank while bypassing the engine. Energy recovery systems, systems powered by batteries, and solar power can provide power to the vehicle when the main engine is shut off. These technologies are typically used to run air conditioning, heat, and electrical accessories in heavy-duty vehicles such as long-haul trucks.

Other devices connect to an external power source using a regular power plug. For example, block heaters can be plugged into outlets in personal garages or at electrified parking spaces and are typically used for starting purposes in cold weather. Less fuel is then required to start the engine as the block heater pre-warms the engine, reducing the need to idle. In some parts of Canada, like Winnipeg, many public parking places have plug-ins for personal vehicles for this use.

Electrified parking spaces are sometimes found at truck rest stops. These allow the driver to shut off the engine and access electricity through an external system that is mounted into the truck’s window frame. Electricity from this system can support heating, air conditioning, television, and refrigerator power needs within the truck cab. This technology is similar to the way electricity is provided at marinas and in Recreational Vehicle (RV) parks.

Local air quality could improve significantly when electricity from an external source is used to power large vehicles in places such as trucking rest stops or bus terminals. However, using electricity could result in creation of air pollution at fossil-fuelled power generation plants in Ontario and the United States. The amount of air pollution generated from electricity use depends on the supply mix at any particular time. Most on-board appliances draw less energy than what is supplied by the vehicle's engine, and are often used overnight when energy demands are typically low. Externally supplied electricity is probably associated with fewer emissions most of the time.

Many idle-reduction technologies have been designed for heavy-duty trucks, but most can also be used in buses, lighter duty trucks, and personal vehicles.

Effectiveness of Idle Reduction Technologies

Most research on idle reduction technologies focuses on heavy duty trucks. The results suggest that when idle reduction technologies are used they are effective in reducing idling. In 2004, The Canadian Centre for Pollution Prevention and Environment Canada's EcoAction program initiated a case study as part of the Truckers Idling Reduction Program to evaluate the benefits and limitations of idle reduction technologies. Data collected over a four month period in 2004 indicated that all long duration idling (e.g. when sleeping overnight) was replaced by the use of anti-idling devices.

In 2006, the American Transportation Research Institute (ATRI) reported findings of a national survey designed to gather information on the extent of idling and use of idle reduction technologies among trucking companies in the US. Approximately 80% of those using these technologies were either satisfied or very satisfied with these technologies.

Several municipalities in the GTA are currently assessing idle reduction technologies in municipal fleets. In 2007 the Clean Air Partnership released a report, "Actions Being Taken by GTA-CAC Municipalities to Reduce Emissions from Municipal Vehicles". One of the areas examined in this study was the use of idle reduction technologies in municipal off-road equipment and heavy-duty fleets.

Idling reduction technology in heavy duty or off-road vehicles was reported in several locations, including Burlington, Hamilton, Markham, Oshawa, Peel, Richmond Hill, and Toronto. Markham and Toronto reported the use of in-cab heaters; Burlington, Oshawa, and Peel reported the use of automatic shut-down devices (e.g. in waste collection vehicles, and some snow plows); Markham and Richmond Hill reported using low voltage lighting fixtures in their vehicles and auxiliary batteries (e.g. to power tools such as grinders and drills). Evidence on their effectiveness is currently not available but anticipated in the future.

Cost-benefits analyses demonstrate the fuel savings of idle reduction technologies over time. The technologies ultimately pay for themselves and then provide ongoing financial savings. According to Natural Resources Canada, gasoline engines consume between 2.5-

4 litres of fuel per hour while idling, and diesel engines use from 1-4 litres per hour (depending on the size of the engine, the idle speed, accessory loads and power take-offs). If fuel costs continue to rise, the payback time for the technologies will get shorter.

Research on the use and effectiveness of idle reduction technologies in personal vehicles is not readily available. Future research in this area is warranted. In the meantime, the available evidence shows that when idle reduction technologies are implemented and used they are quite effective in reducing idling.

Ongoing Anti-idling Activities in Toronto

There are several anti-idling strategies currently underway in Toronto.

One of the main approaches is the Idling Control Bylaw. Toronto Public Health developed the idling control bylaw in 1996 restricting vehicle idling to 3 minutes in a given 60 minute period, with some exemptions made for emergency vehicles and in certain weather conditions.

Transportation Services is responsible for enforcing the idling bylaw with the assistance of the Toronto Police Service. This is accomplished through general monitoring, public complains and intensive enforcement campaigns during spring and fall of each year. City issued media releases announce the campaigns to the media and major local publications and television stations cover the story annual. During an enforcement campaign or when the Medical Officer of Health declares a smog alert, by-law enforcement staff are re-assigned from their regular duties to give priority to the idling Control By-law especially in areas where historically complaints have been received. Campaigns target areas within the City of Toronto where drivers commonly idle their vehicles. Anti idling signs are also posted in areas where chronic complains have been received such as schools and major attraction centres. Campaigns are coupled with an educational strategy and by-law enforcement staff on routine patrols. In 2007, Transportation Services issued 853 warnings and 33 tickets for idling by-law offences.

Transportation Services also operates a 24 hour hotline for members of the public to report idling infractions and obtain information on the idling by-law.

Public Health and Transportation Services have produced educational materials and these materials are distributed to civic, community and recreational centres, day care facilities public libraries, major car rental agencies, schools and driving schools. City of Toronto parking permits also include information on the idling by-law. In addition, Public Health and Transportation Services conduct regular educational and outreach activities to promote awareness of the idling by-law at schools and at large corporate fleets.

The City's Fleet Services Division actively promotes idle reduction through several initiatives. In the spring of 2007 they launched the "Idle-Free" campaign to reduce vehicle idling and promote a 10 second idling policy for staff. This policy states that all City employees are expected to limit idling to 10 seconds. The policy also outlines

vehicle warm-up times for heavy duty vehicles to reduce lengthy warm-up times in the morning.

Fleet Services also monitors a selection of municipal fleet vehicles. They respond to complaints from the public about idling in City vehicles, and conduct spot checks for idling and safety. Fleet Services has ongoing and planned pilot studies to assess idle reduction technologies such as automatic shut-down devices. Fleet Services has purchased many hybrid vehicles that eliminate idling, including three hybrid aerial bucket trucks for Forestry. Many of these are described in the Green Fleet Plan (http://www.toronto.ca/fleet/gfp_08_11.htm), which outlines a comprehensive approach to reducing the environmental impact of the City's vehicles.

The Toronto Transit Commission (TTC) encourages their drivers to minimize idling. TTC currently has 150 hybrid buses, with plans to have 410 by the end of 2008 (nearly 50% of their fleet), and therefore reduce vehicle emissions.

Toronto Hydro uses several idle reduction technologies. Since 1998 all new aerial device trucks have been fitted with remote ignition controls. Since 1999, all medium-duty trucks have automatic shut-off systems. All medium-duty trucks also have an auxiliary battery system so that vehicle engines can be shut off at a work site without losing use of onboard equipment. Toronto Hydro also uses auxiliary cab heaters so that drivers can maintain a comfortable cab temperature without the use of the engine.

Challenges to the Adoption of Idle Reduction Technologies

Each idle reduction technology has advantages and disadvantages. For example, while the automatic shut-off system is relatively inexpensive, it has been reported to be noisy and somewhat ineffective in extremely cold weather when set to switch off after reaching a threshold temperature. An auxiliary power system can be used anywhere and anytime, but is associated with a relatively high cost and can take up a lot of space. Separate heaters or air conditioners are relatively inexpensive but only provide temperature and not full electrical service, making them less useful for vehicles like trucks that require power for other accessories in the sleeper cab.

Installation and maintenance costs are potential barriers to the use of idle reduction technology. When American Transportation Research Institute respondents were asked how much respondents would be willing to pay per truck for idling reduction technologies, responses averaged at $2,200, which is lower than the average cost of on-board idle-reduction technologies. According to ATRI, on-board technologies may also cost $100-$200 dollars per year to maintain.

The availability of financial incentives such as cost-shared funding, grants, tax credits, low-interest loans, and leasing opportunities make idle-reduction technologies more accessible. Transport Canada currently offers two such incentives: The Freight Technology Incentive Program and the Freight Technology Demonstration Fund. These programs provide cost shared funding to support the purchase and installation of

technologies that can reduce the amount of fuel consumed and emission of air pollutants and greenhouse gases. The purchase of idle reduction technologies is an example of an eligible project supported by these funding opportunities.

In addition to the provision of financial incentives, providing information regarding the financial payback of idle reduction technologies is another way to encourage their use.

Cars are not manufactured solely for Toronto, and many vehicles operating within Toronto, such as large trucks or tourist coaches from the United States, originate from other cities. The City does not have municipal authority over these vehicles, which makes it difficult to require the use of any idle reduction technologies in these vehicles. The Federal Minister of Transport, Infrastructure and Communities in collaboration with Ontario's Minister of Transportation, should be encouraged to mandate idle-reduction technologies for all new vehicles and promote idle reduction.

Lack of knowledge about the availability of idle reduction technologies, habits around idling, and myths about idling and engine performance are further challenges to the use of these technologies. For example, a common myth is that it takes more fuel to stop and restart an engine than it does to idle, when in fact, 10 seconds of idling uses more fuel than turning off the engine and restarting it. As well, many people do not realize that improved vehicle technology has eliminated the need to "warm up" engines in personal vehicles.

The simplest and most effective way to reduce idling is for people to turn off their engines. Educating people that idling is not necessary is key to successfully reducing idling in Toronto. The Toronto idling bylaw offers an opportunity for educating people about the impacts of idling and promoting idle reduction. However, Toronto's bylaw currently permits vehicles to idle for 3 minutes, which is not consistent with the message that idling is not necessary. It is also inconsistent with the corporate "idle-free" policy.

Public Health and Transportation Services should explore the implications of reducing the current 3 minute idling regulation with a view of reducing the time limit regulation to 10 seconds to be consistent with Fleet Services' 10 second idling policy for staff.

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