

Police and EMS (PEMS) Vehicle Idling Reduction Project

Background

It is estimated that Ontario's municipal fleets, including Police and Emergency Medical Service vehicles, contribute approximately 0.8 MT of Greenhouse Gas (GHG) emissions - or about 43% of Canada's estimated 1.74 MT of municipal fleet emissions. Fleet operators are becoming increasingly aware of their fleet's impact on the environment and there is a broad and growing interest across Ontario to implement 'green fleet' plans that will reduce the output of harmful emissions in municipalities.

As the cost of fuel steadily increases, Police and Emergency Medical Services (EMS) fleet operators are finding it difficult to adequately fund their equipment operating budgets. These fleets are now amenable to finding new ways of reducing their operating expenses; this with the provision that service levels and emergency response times must not be negatively affected in any way.

Fuel costs are one of the largest single operating expenses (by a wide margin) for today's vehicle fleets and predictions are for continuing price volatility.

Worksite air quality is another important issue of concern. Long-term exposure to harmful exhaust emissions for 1st responders has the potential to negatively impact the health of these professionals.

Police and EMS Fleet Makeup

Police vehicle fleets are predominantly comprised of gasoline powered light-duty vehicles such as sedans, sport-utility vehicles, vans and some light-duty trucks. All three approved police cars are produced exclusively in Ontario for the North American market. These include the Chevrolet Impala (GM - Oshawa), Dodge Charger (Chrysler – Brampton) and the Ford Crown Victoria (Ford – St. Thomas).

EMS fleets are typically comprised of domestically built gasoline and diesel powered Class 1-4 trucks, a smaller number of sports-utility vehicles, commercial vans and the largest number of vehicles being medium duty cut-away chassis' fitted with aftermarket ambulance bodies.

While the automotive world has made great progress in producing hybrid gas-electric vehicles and are aggressively working on other new green vehicle technologies, at this time few, if any, green options are available for the vehicles that now make up the Police and EMS fleets.

While published statistics on fleet sizes are scarce, we estimate there are 6000 or more police vehicles in Ontario (the O.P.P and the City of Toronto Police have almost 4000 alone) and there are 812¹ EMS ambulance vehicles.

¹ Source: RIS International for Fleet Challenge Ontario Business Plan

The Economic and Environmental Issues: Police and EMS Engine Idling

Police and EMS fleet fuel consumption is extremely high due to extensive amounts of idling. Idling can be as much as 75%, and frequently more, of total engine time operated. This is because the vehicle's propulsion engine, most frequently a large displacement V-8 gas or diesel, must idle almost continuously even though the vehicle is stationary, in order to meet electrical demands of auxiliary equipment and provide in-vehicle environmental needs (heat, a/c). Excessive idling also contributes to higher maintenance costs.

We calculate that these vehicles produce over 96,000 tonnes (police) and 12,000 tonnes (EMS) of Greenhouse Gases².

The Solution

Fleet Challenge Ontario is a not-for-profit program of the Canadian Energy Efficiency Alliance. Fleet Challenge works with fleet operators, technology providers and auto/truck manufacturers to research and catalyze the development of new "green" solutions that will reduce fuel consumption and harmful exhaust emissions.

Fleet Challenge Ontario will orchestrate a Police and EMS (PEMS) Idling Reduction Demonstration project that, through pioneering innovative new technological solutions as outlined herein, has the potential to reduce harmful greenhouse gas (GHG) emissions from these vehicles by as much as 37%. This will mean the elimination of almost 40,000³ tonnes of harmful GHGs annually through reduced idling, while potentially improving worksite air quality for police and paramedic 1st responders.

Technologies to Be Employed

Auxiliary Power Units

Use of a vehicle's propulsion engine to provide heat/AC and to power the vehicle's alternator is a tremendous waste when a small (by comparison) and extremely more fuel efficient Auxiliary Power Unit (APU) could be used. APU devices have evolved steadily since they emerged in response to the Oil Crisis of the 1970's and are now very compact, quiet, and technically sophisticated devices.

One of the more popular APUs available is manufactured in the province of Ontario by Kitchener, Ontario based Teleflex. To date however, APU usage has been limited to Class 8 highway tractors where similar electrical and heating/cooling requirements are found.

For the EMS portion of this project, hybrid drive trains, which automatically shut down a vehicle's engine unless it is being used to drive the vehicle, will be one of the proposed drive trains for the base test vehicles. These are now available for EMS ambulance applications and produced by Azure Dynamics, Mississauga, Ontario.

APU devices have not yet been adopted for use in Police and EMS vehicles. This has been primarily due to the lack of precedent and the relatively high cost of APU technology; however the latter is now changing given the current cost of vehicle fuels and environmental concerns.

² Life Cycle GHG calculations based on historical E3 Fleet System data analysis

³ Reduction calculated by comparing historical E3 Fleet System statistics for police and EMS vehicles to 2006 EnerGuide fuel consumption averages for the Ford Crown Victoria (police) and using a 25% reduction for EMS.

Other Technologies

Supporting technologies will be required to form part of an integrated final solutions package and therefore included in the demonstration project. Included may be an automatic engine stop/start device (i.e., a device used to stop the vehicle's engine automatically if no activity is detected in a pre-determined period of time and one such unit is distributed by Ontario-based Autovision Wireless). Re-programming of the vehicle's Electronic Control Module (ECM) is another option to be explored in conjunction with the auto/truck OEMs.

Project Description

The project will be rolled out over a two year period and exist in a broad collaboration. The collaboration will include (but not be limited to) representatives of:

- Fleet Challenge Ontario
- Project alliance partners
- Fleet up-fitters and specialty providers (i.e., Vehicle Dynamics Group)
- Ontario police & enforcement fleet operators (i.e., Municipal, OPP and MTO)
- Ontario EMS fleet operators (i.e., public and private sector)
- Ontario based Police and EMS vehicle manufacturers (GM, Ford and Chrysler)
- Ambulance body builders (Crestline and Demers)
- Ontario technology providers (i.e., Azure Dynamics, APU manufacturers etc.)
- Trade Union representatives (i.e., the C.A.W., OPSEU and CUPE)
- Other stakeholders (i.e., Magna, Litens and others)
- Fleet operator associations such as the Private Motor Truck Council (PMTC), Ontario Trucking Association (OTA), Cdn Association of Municipal Fleet Operators (CAMFM), National Association of Fleet Administrators-Law Enforcement Group (NAFA-LEG)
- Others

Project Rollout

Under this project, Fleet Challenge Ontario, as not-for-profit project managers without commercial bias, will bring together all identified stakeholders to plan, design, configure, install and test in real operating conditions, various pioneering and innovative new vehicle/technology combinations that will reduce electrical and environmental demands and/or supplant the vehicle's propulsion engines in Police/EMS vehicles. These innovative new applications for existing technologies will significantly reduce or eliminate the need for engine idling altogether.

It is anticipated that the solutions developed during this project will enable police forces and EMS fleets throughout Canada (and elsewhere in North America) to radically reduce their fleet expenses. As well, many of these solutions will also be applicable to other fleets, including taxi cabs and commercial delivery trucks.

The project will result in final design(s) for all affected Police and EMS configurations as set out previously in this document. Results of the PEMS demonstration project will be widely communicated in a strategic and focused manner to fleet industry decision-makers across North America and the communications media.

It is further expected that the resultant Police and EMS vehicle configurations could eventually form an OEM Regular Production Option (RPO). We expect that there may be interest in this RPO at the auto manufacturer level, potentially as a new product offering that will have wide fleet appeal across North America. This project has the potential to re-invigorate the Ontario

auto industry to an extent, by producing innovative new green vehicle options for Police, EMS and other fleets.

Methodology

Fleet Challenge will identify all primary stakeholders and a Stakeholder Advisory Group will be formed. Representation on this group will include spokespersons for all stakeholders including auto makers, technology producers and the unions that represent the auto makers (CAW) and drivers of Police/EMS vehicles (OPSEU and CUPE). This facilitated Stakeholder Advisory Group consultation session is scheduled for March 13, 2009.

Project stakeholders, such as Ontario major auto makers and the technology providers, will be requested to assist with technical resources, test vehicles and technologies. Others of the stakeholder group, such as the end users (fleet operators) will be called upon to beta-test the finished vehicle/technology combinations in a real-world setting and provide their feedback under carefully monitored protocol.

Next, vehicle and technology combinations to be tested will be identified by a technical subgroup and sample test units requested for each chosen vehicle and technology. The technologies will then be installed on the test vehicles. Once the vehicles have been retrofitted testing will begin.

Testing will be completed in a test lab (i.e. 5 gas analysis and dynamometer testing) under standard 3rd party testing protocol. Once the technical team is satisfied, beta testing will be carried out in actual operating conditions in select Police and EMS Fleets. Driver reactions and issues will be noted and systematically addressed, and the solutions will be “tweaked” until a seamless interface between vehicle and technologies exists; one that meets with full acceptance by the Police and EMS vehicle drivers.

The emissions and idle time reductions will be analyzed for each vehicle/technology combination and final results will be tabulated and documented by Fleet Challenge.

A communications team will report the progress of the project from its launch through to its final results. To champion the project goals and objectives, we will seek the participation of a highly visible and well-respected spokesperson, and the Police officers and EMS paramedics who support the project and its goals.

Timeline

The project will run for two (2) years from inception in January 2009.

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