



Environment and Energy Committee Meeting Date: February 10, 2009

To: Environment and Energy Committee

From: Roger Quan, Division Manager, Policy and Planning Department
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Date: January 22, 2009

Subject: **Diesel Emission Reduction Program for Metro Vancouver**

Recommendation:

That the Board endorse the program as described in the report dated January 22, 2009, titled "Diesel Emission Reduction Program for Metro Vancouver", as a basis for further work.

1. PURPOSE

To provide information on a diesel emission reduction program for Metro Vancouver, including actions that can be taken by Metro Vancouver in 2009, and considerations for reducing diesel emissions through regulatory and incentive-based actions.

2. CONTEXT

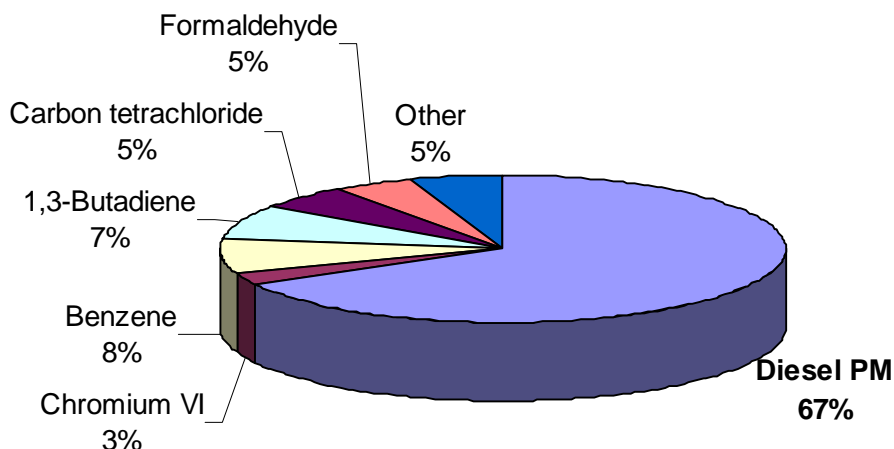
In May 2008, the Committee received a staff report outlining diesel emission reduction initiatives underway in Metro Vancouver. The report provided an update on Metro Vancouver's actions to reduce emissions from its corporate diesel engines, and informed the Committee of the intent to develop a regional diesel emission reduction program. The report provided a summary of regional diesel emissions and highlighted action already underway. Key information on health effects and sources of diesel emissions and actions from that report is reviewed below.

The Case for Action on Diesel Emissions

Health Effects of Diesel Emissions

Emissions from diesel engines are considered to be the most significant contributor to increased human health risk from exposure to air pollution in Metro Vancouver. Potential health impacts from emissions of diesel particulate matter (PM) include increased risk of cancer, asthma, respiratory and cardiovascular illnesses, and premature death. Studies in other urban areas of North America indicate that the lifetime cancer risk from diesel PM emissions exceeds the risk from all other toxic air contaminants combined, comprising approximately 70% of the risk from air pollution. In Metro Vancouver, the estimates are similar. A consultant's assessment indicated that current concentrations of diesel PM are responsible for 67% of the lifetime cancer risk from air pollution. The following figure illustrates the cancer risk of diesel PM relative to other "air toxics".

Apportionment of Lifetime Cancer Risk from Emissions of Air Toxics in Metro Vancouver (overall risk 526 per million)



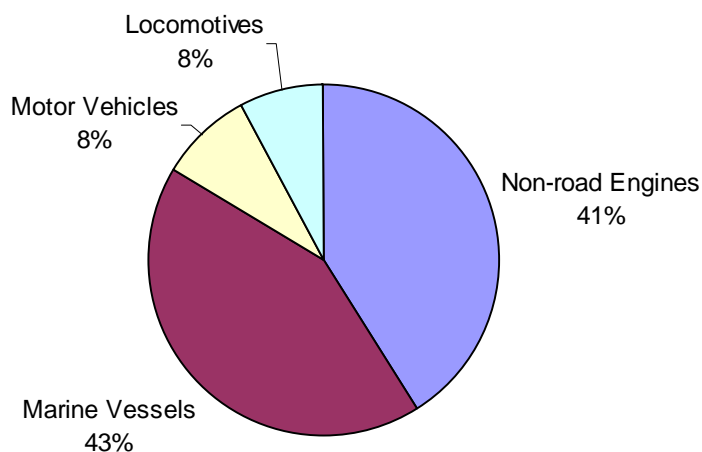
Sources of Diesel Emissions

The primary contributors to emissions of diesel PM in Metro Vancouver are marine vessels, non-road engines (a broad category that includes equipment used in the industrial, construction, recreational, lawn and garden, agricultural and other sectors), onroad motor vehicles (heavy-duty trucks, buses), and rail locomotives. The figure below shows the estimated contribution of diesel PM emissions from various sources in Metro Vancouver.

Diesel emissions often occur at ground level and close to where people live, work and play – resulting in higher exposures and increased health risk. Exposure to diesel emissions and resulting air concentrations of diesel PM tend to be higher near:

- Highways, major roads and interchanges;
- Cargo handling and truck loading areas;
- Construction sites with heavy equipment;
- Rail yards and terminals;
- Ports.

Sources of Diesel PM in Metro Vancouver, 2005



What's Happening Now with Diesel Emissions

There are a number of diesel PM emission reduction initiatives currently underway in Metro Vancouver. Table 1 provides a brief summary of some key actions for each of the main emission sectors.

Table 1 – Summary of Key Regional Diesel Emission Reduction Actions

Emission Sector	Action
Marine Vessels	<ul style="list-style-type: none"> ➤ BC Marine Vessel Air Quality Work Group – a collaboration that includes Environment Canada, Transport Canada, BC Ministry of Environment, BC Ministry of Transportation, Port Metro Vancouver, Chamber of Shipping of BC, BC Ferries and others to review and implement emission reduction actions. ➤ Northwest Ports Clean Air Strategy – includes Port Metro Vancouver, Port of Seattle and Port of Tacoma; to address maritime and port-related emissions that affect air quality and climate change in the Pacific Northwest. ➤ Port Metro Vancouver is also working on several initiatives that would address diesel emissions (e.g. truck licensing system, differential harbour dues, shore power).
Motor Vehicles	<ul style="list-style-type: none"> ➤ Federal diesel engine emission standards – progressively more stringent since 1989; year 2007 and later on-road diesel engines comply with some of the strictest emission standards ever. ➤ Federal diesel fuel quality standards. ➤ Provincial diesel retrofit regulation – development of a provincial regulation requiring retrofits for older commercial transport diesel trucks (diesel oxidation catalyst technology or equivalent for 1989-1993 trucks). ➤ Heavy-duty vehicle inspection and maintenance programs – the provincial AirCare On-Road (ACOR) program uses two mobile units to conduct roadside emission checks across BC. ➤ TransLink Emissions Policy – diesel emission reductions through retrofits, replacements and technology improvements.
Railway Locomotives	<ul style="list-style-type: none"> ➤ BC Rail and Locomotive Air Quality Working Group – a group that includes Metro Vancouver, Environment Canada, Port Metro Vancouver and other BC government agencies with a purpose to facilitate information exchange on the air quality aspects of locomotives in BC, jointly assess measures to reduce rail emissions and impacts, and collaborate on the adoption of the most effective measures in BC.
Non-road Engines	<ul style="list-style-type: none"> ➤ Emission standards for new non-road diesel engines and fuels, which will be phased in from 2010 to 2014.

What Metro Vancouver Can Do – A Diesel Emission Reduction Program for Metro Vancouver

Diesel engines are key contributors to the economy in the Metro Vancouver, playing an important role in goods movement, transportation, and industries such as construction and agriculture. Diesel engines are efficient, reliable and long-lasting. However, with their durability, diesel engines tend to remain in use for many years and fleet turnover to equipment meeting cleaner emission standards can be slow. Given the health risks associated with diesel emissions and the proximity of residents to sources of diesel emissions, mitigating emissions (and resulting health impacts) of diesel engines is a priority. There is a need to ‘fill the gap’ through additional actions in order to address and further reduce emissions from existing diesel engines.

It is notable that while emission standards for diesel engines are becoming increasingly more stringent, they are only applicable to new engines. Consequently, the full benefit of these standards may not be realized for decades given the longevity of existing on-road and non-road engines and the comparatively high emissions of older diesel vehicles and engines. Currently, very little action is being taken with respect to emissions from non-road diesel engines in particular. Given the contribution of this sector to overall diesel emissions, more attention should be given to these sources.

Metro Vancouver's 2005 Air Quality Management Plan (AQMP) includes a number of actions related to reduction of diesel PM emissions. To address the AQMP actions, Metro Vancouver's Sustainability Framework workplan lists the following two items as regional priorities for 2009:

- 1 Identify further regulatory and non-regulatory actions that may be taken by Metro Vancouver to reduce regional emissions of diesel particulates.
- 2 Initiate consultation on regulatory initiatives to reduce non-road diesel emissions.

Regulatory and Non-regulatory Actions

Development of a broad program to address all sources of diesel PM emissions throughout the region is complex. There are a wide range of diesel emission sources regionally, and Metro Vancouver's authority to regulate some of them is limited. As a result, staff has identified a list of actions in the Attachment that can be taken for on-road vehicles (e.g. heavy-duty trucks), non-road engines and equipment, rail locomotives and marine vessels.

The diesel emission reduction program in the Attachment outlines the local health impact associated with the particular emission source and action. Actions identified as having a 'high' local health impact indicates that that particular action for that emission source have high potential to reduce health impacts associated with diesel engine emissions. Also included in the table is a listing of potential lead agencies for each action and the role for Metro Vancouver. Metro Vancouver's role in these actions ranges from direct regulation to education and incentive programs, to collaboration with or advocacy to other levels of government. For example, in the marine and rail sectors where activities and emissions tend to be federally regulated, Metro Vancouver's role is largely one of advocacy and collaboration (e.g. through work planning, provision of technical expertise, etc.).

Table 2 lists priority diesel emission reduction actions for 2009 where Metro Vancouver can be a lead agency, based on variables in the Attachment, such as the potential for reducing health impacts.

Consultation on Regulatory Initiatives

Staff intends to examine regulatory opportunities to reduce emissions of diesel PM in Metro Vancouver. Consequently, a report to this Committee discussing potential regulatory approaches and issues, particularly for non-road engines, and recommending consultation, will be prepared in the coming months.

Corporate Diesel Reduction Actions

Metro Vancouver has also initiated a corporate program to reduce its own emissions from diesel engines, as reported to the Committee in May 2008. Some of those actions include:

- Retrofit of pre-2007 model year diesel trucks operated in the Metro Vancouver fleet;

- Replacement of older fleet equipment with equipment meeting improved emission standards;
- Replacement of contracted waste-hauling trucks with trucks meeting cleaner 2007 emission standards;
- Use of ultra-low sulphur diesel in non-road equipment operated by Metro Vancouver;
- Planned retrofits of non-road engines/equipment;
- Development of diesel equipment purchase/lease guidelines and idle reduction programs.

Table 2 – Preliminary Diesel Emission Reduction Work Program for 2009

Emission Source and Action	Role for Metro Vancouver / Status
Onroad Vehicles	
Expedite the development of initiatives to address 1994-2006 model year commercial on-road heavy-duty diesel vehicles.	Advocacy, regulatory – Board recommendation to Province September 2008
Tighten the emission/opacity standards for heavy-duty diesel vehicles in recognition of the reduction in smoke emissions which have occurred due to improved engine technology.	
Ensure that adequate staff resources are allocated for effective enforcement of the AirCare On-Road (ACOR) Program.	
Work with other government agencies to enact municipal bylaws and provincial regulations to reduce idling from heavy-duty diesel vehicles.	Advocacy
Develop best practices for member municipalities and owner/operators of heavy-duty vehicles to reduce diesel emissions (e.g. purchasing, rental and leasing guidelines).	Policy, Business services
Develop incentive program for diesel emission reduction programs (includes retrofits and cleaner fuels).	Policy, incentives
Non-road Engines	
Evaluate and consult on programs for regulating sources at a regional level (e.g. construction equipment).	Regulatory
Work with other government agencies to enact municipal bylaws and provincial regulations to reduce idling from heavy-duty non-road diesel engines/equipment.	Regulatory, Advocacy
Develop best practices for member municipalities and owners/operators of heavy-duty vehicles to reduce diesel emissions (e.g. purchasing, rental and leasing guidelines).	Business services
Develop incentive program for diesel emission reduction programs (includes retrofits and cleaner fuels).	Policy, incentives
Locomotives	
Regulatory actions for local rail yards may be possible (e.g. with respect to idling locomotives).	Regulatory
Continued involvement in BC Rail and Locomotive Air Quality Working Group.	Advocacy
Marine Vessels	
Undertake demonstration project to evaluate the feasibility and benefit of the use of biodiesel in harbour vessels and ferries in Metro Vancouver.	Collaboration
Continued involvement in BC Marine Vessel Air Quality Work Group.	Advocacy

3. ALTERNATIVES

The Board may:

- 1 endorse the diesel emission reduction program for Metro Vancouver as a basis for further work,
- Or
- 2 refer the report back to staff with direction to consider additional or different actions to reduce diesel emissions in Metro Vancouver.

4. CONCLUSION

Emissions from diesel engines make a significant contribution to human health risk from air pollution in Metro Vancouver, more than all other toxic air contaminants combined. A number of actions are already underway with the intent of reducing diesel emissions, but given the risk to health and the proximity of most emissions to the public, more needs to be done.

This report outlines a diesel emission reduction program for the region, and work program priorities for Metro Vancouver for 2009 are identified. Particular focus is paid to sources of diesel emissions where Metro Vancouver can play a significant role, such as existing non-road engines, an area where very little work is currently being done. Metro Vancouver's role in these actions ranges from direct regulation to education and incentive programs, to collaboration with or advocacy to other levels of government, with an ultimate focus of reducing diesel emissions and their impact on human health.

ATTACHMENT

Diesel Emission Reduction Program for Metro Vancouver.

Diesel Emission Reduction Program for Metro Vancouver

ATTACHMENT

Emission Source and Actions	Local Health Impact	Possible Lead Role*	Role for Metro Vancouver	Timeline
Onroad Vehicles (8% of diesel PM emissions)				
1. Expedite the development of initiatives to address 1994-2006 model year commercial on-road heavy-duty diesel vehicles.	High	BCMOE, BCMOT	Advocacy	2009-2010
2.1 Tighten the emission/opacity standards for heavy-duty diesel vehicles in recognition of the reduction in smoke emissions which have occurred due to improved engine technology.	Medium	BCMOE, BC MOT, MV	Regulatory, Advocacy	2009
2.2 Require large fleet owners to perform smoke inspection or opacity tests on their own fleet vehicles to ensure compliance with standards.				
2.3 Ensure that adequate staff resources are allocated for effective enforcement of the AirCare On-Road (ACOR) Program.				
3. Advocate for renewable fuel standards with minimum 20% content, within Metro Vancouver by 2020.	Medium	BCMOE, EC	Advocacy	2009-2011
4. Work with other government agencies to enact municipal bylaws and provincial regulations to reduce idling from heavy-duty diesel vehicles.	Medium	BCMOE, Municipalities	Advocacy	2009
5. Develop best practices for member municipalities and owner/operators of heavy-duty vehicles to reduce diesel emissions (e.g. purchasing, rental and leasing guidelines).	Low-Medium	MV, Municipalities	Policy, Business services	2009
6. Develop incentive program for diesel emission reduction programs (includes retrofits and cleaner fuels).	Medium	MV, EC, BCMOE	Policy, incentives	2009-2010
Non-road Engines (41% of diesel PM emissions)				
7. Expedite the federal government's planned amendments to the Off-Road Compression-Ignition Emission Regulations to incorporate Tier 4 emission standards in alignment with U.S. EPA standards.	High	EC	Advocacy	2009
8. Evaluate and consult on programs for regulating sources at a regional level (e.g. construction equipment).	High	MV	Regulatory	2009
9. Encourage provincial government to extend renewable fuel standards to cover non-road engines within Metro Vancouver.	Medium	BCMOE, EC	Advocacy	2009-2011

Emission Source and Actions	Local Health Impact	Possible Lead Role*	Role for Metro Vancouver	Timeline
10. Work with other government agencies to enact municipal bylaws and provincial regulations to reduce idling from heavy-duty non-road diesel engines/equipment.	Medium	MV, BCMOE, Municipalities	Regulatory, Advocacy	2009
11. Develop best practices for member municipalities and owners/operators of heavy-duty vehicles to reduce diesel emissions (e.g. purchasing, rental and leasing guidelines).	Low-Medium	MV, Municipalities	Business services	2009
12. Develop incentive program for diesel emission reduction programs (includes retrofits and cleaner fuels).	Medium	MV, EC, BCMOE	Policy, incentives	2009-2010
Locomotives (8% of diesel PM emissions)				
13. With participation from industry and other government agencies, undertake a demonstration project to evaluate the feasibility and benefit of LNG in switch locomotives in Metro Vancouver rail yards.	Medium	Industry, BCMOE, BCMOT, EC, TC, Port MV, NRCan (14)	Advocacy, collaboration	2009-2011
14. With participation from industry and other government agencies, re-evaluate the testing of biodiesel in switch locomotives in Metro Vancouver rail yards.	Low-Medium			2009-2011
15. Encourage railway companies to use ultra-low sulphur diesel (ULSD) in rail yard and line haul operations prior to regulated use in 2012.	Medium			2009-2011
16. Encourage railway companies to replace older switchers in Metro Vancouver rail yards with cleaner low emission technology engines.	Medium			2009-2015
17. Encourage railway companies to replace older switchers and line haul locomotives (pre Tier 0, Tier 0 and Tier 1) in Metro Vancouver with Tier 2, Tier 3 and Tier 4 engines as they become available.	Medium – High			2009-2015
18. Encourage railway companies to reduce idling at rail yards by retrofitting switchers and line haul locomotives with automatic anti-idling and low-idling systems (e.g. auxiliary power units, “HotStart” systems and automatic electronic shutdown systems).	Medium			2009-2015
19. Encourage railway companies to retrofit switchers and line haul locomotives with diesel PM reducing devices such as diesel oxidation catalysts (DOCs) and diesel particulate filters (DPFs).	Medium – High			2009-2015

Emission Source and Actions		Local Health Impact	Possible Lead Role*	Role for Metro Vancouver	Timeline
20.	Encourage the federal and provincial governments to harmonize locomotive emission standards with US EPA for both federally and provincially operating railway companies.	Medium	BCMOE, BCMOT, EC, TC	Advocacy, Regulatory	2009-2010
21.	Develop regional/municipal bylaws to address complaints related to idling in Metro Vancouver switch yards.	Medium		Advocacy, Regulatory	2009-2011
22.	Develop outreach and education programs for railway operators through the BC Rail and Locomotive Air Quality Working Group.	Low – Medium		Outreach and Engagement	Ongoing
Ocean-going Marine Vessels (31% of diesel PM emissions)					
23.	With participation from industry, ports and other government agencies, undertake a demonstration project to evaluate the feasibility and benefit of LNG as a fuel source for shore power installations.	High	Port MV, EC, Terasen Gas	Advocacy, collaboration	2009
24.1	Encourage federal / provincial governments to provide funding of land side shore power installation at Canada Place for cruise ships and at Delta Port for container ships.	High	EC, TC, MV, Port MV	Advocacy, collaboration	2008-2009
24.2	Work with federal / provincial governments to ensure that new terminals and expansion of existing terminals include shore power infrastructure.				
25.	Encourage shipping industry to use low sulphur marine diesel and bunker fuels in advance of the International Maritime Organization (IMO) Annex VI regulation and creation of an Emission Control Area (ECA).	Medium – High	Shipping industry, Port MV, EC, MV, BCF	Advocacy, collaboration	2009-2013
26.	Encourage shipping line owners to retrofit vessels with slide valves on main engines.	Low-Medium			2009-2015
27.	With participation from industry and other government agencies, undertake demonstration projects to evaluate the feasibility and benefit of emerging diesel PM retrofit technologies such as diesel oxidation catalysts (DOCs) and diesel particulate filters (DPFs).	Medium			2009-2015
28.	Encourage the federal government to ratify IMO Annex VI and develop domestic regulation to enforce the Annex VI requirements.	Medium	Industry, MV, BC MOE, BC MOT	Advocacy	2009
29.	Encourage the federal government to adopt California regulations prior to the creation of an ECA at BC ports.	High			2009-2011

Emission Source and Actions	Local Health Impact	Possible Lead Role*	Role for Metro Vancouver	Timeline
Other Marine Vessels - harbour vessels, ferries (12% of diesel PM emissions)				
30. With participation from industry and other government agencies, undertake demonstration project to evaluate the feasibility and benefit of the use of biodiesel in harbour vessels and ferries in Metro Vancouver.	Low – Medium	CMC, TC, EC, BC MOE, BC MOT, NRCan (30), BCF, Port MV	Advocacy, collaboration	2009
31. Encourage harbour vessel operators to use ULSD in their vessels prior to regulated use in 2012.	Medium			2009-2011
32. Encourage harbour vessel operators to rebuild or replace existing engines (Tier 0, 1) to meet US EPA Tier 2.	Medium			2009-2015
33. Encourage harbour vessel operators to retrofit existing vessels with DOCs and DPFs to reduce diesel emissions.	Medium			2009-2015
34. Encourage harbour vessel operators to replace existing vessels with newer vessels meeting US EPA Tier 3 and 4 emission standards.	Medium	Industry, MV, BC MOE, BC MOT	Advocacy, collaboration	2009-2015
35. Encourage the federal and provincial governments to harmonize Category 1 and 2 marine engine emission standards with US EPA.	Medium – High	Industry, MV, BC MOE, BC MOT	Advocacy	2009
36. Encourage the federal and provincial governments to develop incentive programs for continued support for emission reduction actions.	Medium	EC, TC, BC MOE, MV	Advocacy, collaboration	2009-2010

- * MV – Metro Vancouver
BCF – BC Ferries
BC MOE – BC Ministry of the Environment
BC MOT – BC Ministry of Transportation and Infrastructure
CMC – Council of Marine Carriers
EC – Environment Canada
NRCan – Natural Resources Canada
Port MV – Port Metro Vancouver
TC – Transport Canada