metrovancouver

Proposed Expansion of the Non-Road Diesel Engine Emission Regulation

Discussion Paper, August 2020

Contents

Purpose 5

Defining the Problem 6

Guiding Principles 8

Working within the Legislation 8

Proposed Regulatory Changes 10

Providing Feedback and Comments 16

Appendix A 17

Table 1: Current Diesel Particulate Matter Emissions Standards by Horsepower, Bylaw 1161, 2012 17

Table 2: Diesel Particulate Matter Emissions Standards by Horsepower 18

Table 3: Nitrogen Oxides Emissions Standards by Horsepower 19

Table 4: Current Fee for Diesel Particulate Matter in $/HP. Based on Tier level 20

Table 5: Proposed 2022 Diesel Particulate Matter Fees in $/HP - Based on $/tonne DPM 21

Table 6: Proposed 2022 Nitrogen Oxides Fees in $/HP - Based on $/tonne NOx 22

Table 7: Proposed 2022 Total fees (Diesel Particulate Matter + Nitrogen Oxides) in $/HP - Based on $/tonne 23

Table 8: Proposed 2025 Diesel Particulate Matter Fees in $/HP - Based on $/tonne DPM 24

Table 9: Proposed 2025 Nitrogen Oxides Emission Fees in $/HP- Based on $/tonne NOx 25

Table 10: Proposed 2025 Total fees (Diesel Particulate Matter + Nitrogen Oxides) in $/HP - Based on $/tonne 26

Introduction

The Metro Vancouver Regional District (MVRD, operating as Metro Vancouver) consists of 21 municipalities, one electoral Area and one Treaty First Nation. Metro Vancouver is responsible for managing air quality in the region and regulating the discharge of air contaminants under authority delegated from the provincial government in the British Columbia *Environmental Management Act* (EMA). Metro Vancouver protects public health and the environment by leading efforts to reduce emissions from non-road diesel engines in the region through the *Metro Vancouver Regional District (MVRD) Non-Road Diesel Engine Emission Regulation Bylaw No. 1161, 2012* (Bylaw 1161).

Bylaw 1161 regulates older, higher emitting non-road diesel engines classified as Tier 0 and Tier 1 in an effort to reduce diesel particulate matter (DPM) that is harmful to health and the environment, including climate change. Bylaw 1161 does not apply to non-road diesel engines that power machines used for farm businesses, personal recreation, and emergency power generation. Currently, Bylaw 1161 requires engine registration and labelling for Tier 0 and Tier 1 engines that are larger than 25 horsepower. Bylaw 1161 registration and labelling requirements do not currently apply to newer Tier 2, Tier 3 and Tier 4 engines.

To prevent additional older, higher emitting non-road diesel engines from entering Metro Vancouver, Bylaw 1161 prohibited the operation in the region of Tier 0 engines after January 1, 2015 and of Tier 1 engines after January 31, 2020, unless the engine was registered and had paid operating fees before those dates. Engine owners seeking to operate in the region must replace older engines with lower-emitting engines of a higher tier, install emission reduction measures, or use previously registered engines. The registration deadlines and other elements in Bylaw 1161, such as escalating registration fees, have promoted emission reductions over time.

Purpose

The purpose of this discussion paper is to:

- Provide information about the environmental and health impacts of emissions from non-road diesel engines in Metro Vancouver;
- Describe proposed amendments to Bylaw 1161 and;
- Support consultation and encourage feedback from affected and interested parties on proposed amendments to Bylaw 1161.

This discussion paper may be of interest to:

- Owners and operators of non-road diesel engines that operate in Metro Vancouver;
- Manufacturers and suppliers of non-road diesel engines and emission control equipment;
- Associations representing owners or operators of non-road diesel engines or affected workers;
- Other interested parties affected by the regulatory proposal or by emissions from non-road diesel engines;
- Indigenous communities;
- Provincial and federal government agencies;
- Metro Vancouver's member jurisdictions; and
- Health authorities.

An engagement program will allow Metro Vancouver to inform interested parties and the public of the proposals for amending Bylaw 1161 described in this discussion paper and to receive feedback on proposed options. Representatives of interested parties and the public are invited to provide feedback by December 13, 2020.

Defining the Problem

Health and Environmental Impacts of Emissions from Non-Road Diesel Engines

Diesel Particulate Matter (DPM)

The exhaust from diesel engines contains a complex mixture of air contaminants including DPM, which is the key driver of health risks associated with toxic air pollutants in the region. Environmental impacts of emissions from diesel combustion include reduced visibility and contribution to climate change. Black carbon present in DPM has been identified as a short-lived climate forcer, which has a high global warming potential and remains in the atmosphere for a shorter period of time than carbon dioxide. The 2018 Special Report of the Intergovernmental Panel on Climate Change (IPCC) identified major reductions in black carbon emissions as a pathway to limit global warming.

Nitrogen Oxides (NOx) and Nitrogen Dioxide (NO_2)

Nitrogen dioxide (NO_2) is one of a group of gases known as nitrogen oxides (NOx) that are produced during high-temperature fuel combustion. On hot and sunny days, NOx can react with volatile organic compounds (VOC) to form harmful ground-level ozone. NOx can also react with other air contaminants to form fine particulate matter ($PM_{2.5}$), a priority air contaminant in the region. NO_2 has direct respiratory effects and contributes to early mortality, particularly for the elderly and those with pre-existing respiratory conditions. There is no known safe level for NO_2, as noted in the 2017 Health Canada study "Health impacts of air pollution in Canada: an estimate of premature mortalities".

In addition to negative health impacts, NO_2 can damage ecosystems through acid rain and eutrophication (when bodies of water become overly enriched with nutrients). The formation of secondary fine particulate ($PM_{2.5}$) involving NOx can impair visual air quality and result in economic losses for tourism and recreational activities.

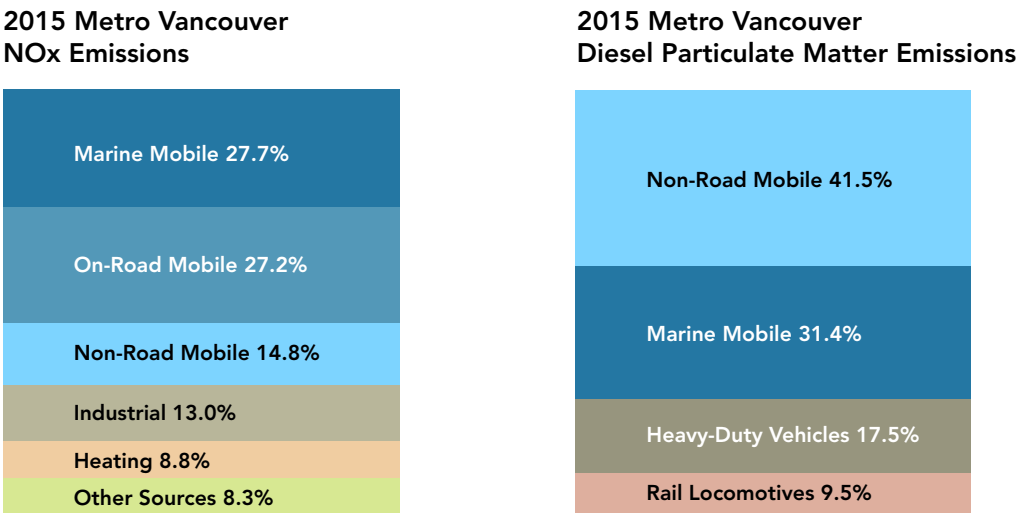
Metro Vancouver develops ambient air quality objectives for NO_2 and other air contaminants to minimize their impacts on public health and the environment. In November 2019, the MVRD Board adopted more stringent ambient air quality objectives for NO_2 which came into effect for 2020.

Emissions from Non-Road Diesel Engines in Metro Vancouver

The "tier" level of a non-road diesel engine relates to both the age and the amount of emissions it produces. All tiers of non-road diesel engines generate emissions of DPM and NOx. Tier 0 engines are older engines that do not have any emission controls. Tier 1 engines generate slightly lower levels of emissions, but do not have the extent of emission controls found on Tier 2 and 3 engines and, to a much greater extent, on Tier 4 engines.

The 2015 Lower Fraser Valley Air Emissions Inventory indicates that non-road diesel engines are the highest contributor of DPM and the third highest contributor of NOx in the Metro Vancouver region, as shown in Figure 1 on the next page.

FIGURE 1: NITROGEN OXIDE AND DIESEL PARTICULATE MATTER EMISSIONS BY SOURCE FOR THE METRO VANCOUVER REGION (2015)



Bylaw 1161 has been successful at reducing emissions and impacts from Tier 0 and Tier 1 engines, but overall, non-road diesel engines continue to be significant contributors of emissions that pose a threat to human health and the environment, including climate change. Metro Vancouver proposes to expand the scope of Bylaw 1161 to address emissions of DPM and NOx from Tier 2 and Tier 3 non-road diesel engines, and eventually, Tier 4 engines.

Impacts of Economic Instruments to Promote Emission Reductions

Metro Vancouver uses economic instruments to encourage registrants to retire or upgrade higher emitting non-road diesel engines to Tier 2, 3, or 4 engines or electric engines. The program allows up to 12 months for registrants to claim a refund of up to 80% of the registration fees paid for an engine in the past three years when that engine is upgraded or permanently retired from operation in the region. The remaining portion of registration fees is intended to cover the costs of developing and implementing the regulatory program.

Under the current refund structure, approximately 250 Tier 0 and Tier 1 engines have been retired (permanently withdrawn from operation) within the Metro Vancouver region, and 95 engines have been upgraded with emission reduction measures since the regulation was introduced in 2012. In contrast, more than 1120 registered engines have reportedly been moved out of the Metro Vancouver region while retaining the ability to return to operating in the region. Metro Vancouver would like to encourage additional permanent retirements and upgrades of higher emitting non-road diesel engines through economic instruments, while continuing to recover the costs of the regulatory program.

Fees to assess the eligibility of emission reduction measures offered by technology providers are also proposed to recover the costs to Metro Vancouver associated with assessing these technologies.

Guiding Principles

Amendments to the regulatory strategy for addressing non-road diesel engines in Metro Vancouver would aim to:

- Address all non-road diesel engine tiers in continued efforts to minimize the risk to public health, the local environment, and the global climate due to emissions from these engines;
- Contribute to the achievement of stricter regional ambient air quality objectives for NO_2;
- Accelerate the retirement or upgrading of higher emitting non-road diesel engines; and
- Recover regulatory program costs in an effective, fair, and efficient manner.

Working within the Legislation

Federal Regulations

Off-Road Compression-Ignition Engine Emissions Regulations, 2006

The federal *Off-Road Compression-Ignition Engine Emissions Regulations* enacted in 2006 set a performance-based emissions standard for air pollutants and toxic substances from new off-road diesel engines used in construction, mining, farming and forestry machines. These standards were set to protect the environment and public health through the reduction of smog-forming pollutants. The main requirements for importers and manufacturers of off-road diesel engines include proving that engine emission standards are met, labelling engines, record-keeping, reporting, and giving notice of defects.

Locomotive Emissions Regulations, 2017

On June 9, 2017 the federal *Locomotive Emissions Regulations* came into force to regulate the production of criteria air contaminants. Rail transportation is a significant source of diesel emissions in the Metro Vancouver region, accounting for approximately 10% of the DPM emissions. Furthermore, locomotive emissions can potentially result in higher exposures and health risks for residents of the region that live near rail yards. Working with transportation sectors such as rail can help bridge the gap in regulating diesel emissions from various modes of transport.

Canadian Ambient Air Quality Standards (CAAQS)

Metro Vancouver sets regional ambient air quality objectives with consideration of objectives and standards established by other orders of government, including the Canadian Ambient Air Quality Standards (CAAQS). CAAQS are a key element under the national Air Quality Management System, adopted by the Canadian Council of Ministers of the Environment (CCME) in 2012. CAAQS are established under the *Canadian Environmental Protection Act* and are intended to drive action to protect human health and the environment. Development of the CAAQS is supported by recent and comprehensive scientific health assessments, conducted through multi-stakeholder collaboration involving representatives from NGOs, Indigenous communities, public health agencies and industry, and reflects consensus among these representatives.

Increasingly stringent CAAQS for ozone and fine particulate matter ($PM_{2.5}$) were established in 2013, for achievement by 2015 and 2020. CAAQS for NO_2 were established in 2017, for achievement by 2020 and 2025. Metro Vancouver's current objectives for $PM_{2.5}$ are equivalent to or more stringent than the current CAAQS and provincial objectives. In November 2019, the Metro Vancouver Board adopted more stringent ambient air quality objectives for NO_2 to align with provincial and federal standards.

Expansion of Metro Vancouver's regulatory requirements for non-road diesel engine emissions to further address NO_2 emissions will support the achievement of the more stringent ambient air quality objectives.

Provincial Regulations

The BC *Environment Management Act* delegates authority to Metro Vancouver to regulate emissions of air contaminants within the region. There is no specific legislation that applies to non-road diesel engines at the provincial level.

Metro Vancouver's Regulatory Jurisdiction for Non-Road Diesel Engines

Under Section 31 of the *Environmental Management Act* (EMA), Metro Vancouver has the delegated authority for air pollution control and air quality management within the Metro Vancouver region, including on industrial and agricultural land. EMA states that the Metro Vancouver Board "may, by bylaw, prohibit, regulate and otherwise control and prevent the discharge of air contaminants." Under *Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008* (Bylaw 1082), Metro Vancouver exercises its air quality regulatory authority with a system of permits and approvals that apply to individual facilities and emission regulations that apply to types of operations and activities having similar characteristics. For example, Metro Vancouver regulates air emissions from non-road diesel engines through the *Greater Vancouver Regional District Non-Road Diesel Engine Emission Regulation Bylaw No. 1161, 2012* (Bylaw 1161).

Municipal Bylaws and Policies

Metro Vancouver municipalities are starting to adopt policies and programs related to the use of electric engines, shifting away from engines powered by fossil fuel. For example, the City of Vancouver intends to develop a power supply plan for film, food trucks, and special events to help them transition away from the use of diesel and propane generators, as part of the City of Vancouver's Climate Emergency Response report approved on April 29, 2019.

Municipalities also have bylaws that regulate the hours for testing emergency generators, however these bylaws are focused on noise control and not the control of exposure to emissions.

Path Forward

All the above listed regulatory tools from various levels of government support Metro Vancouver's regional management of emissions from non-road diesel engines. This discussion paper presents proposed amendments to Bylaw 1161 to further reduce emissions from non-road diesel engines in Metro Vancouver in order to minimize impacts on air quality, health, and the environment.

Proposed Regulatory Changes

Metro Vancouver is seeking input from stakeholders representing different perspectives on the following proposed amendments to Bylaw 1161.

Proposed Changes:

1. **Adding registration and labelling of Tier 2 and Tier 3 non-road diesel engines in 2022 and Tier 4 engines in 2025.** While newer non-road diesel engines emit less diesel particulate matter and nitrogen oxides than Tier 0 and 1 engines, they still emit quantities considered a threat to human health and the environment.
2. **Adjusting economic instruments (fees) used to reduce emissions.**
   - *Adding fees for NOx emissions* – Recent science has identified that NOx is more harmful to human health and the environment than previously understood.
   - *Basing fees on DPM and NOx emission standards* – Emissions standards, which vary depending on year of manufacture and size, better reflect actual emissions from a given engine than tier categories alone.
   - To see the impact of these changes on the fees you might pay, visit our Consultation Fee Calculator.
3. **Adjusting the rebate mechanism.** Maximum rebates for engine retirements or upgrades would be based on fees paid in the previous 5 years, starting in 2025, rather than on just the previous 3 years.
4. **Adding a new moderate use category.** "Moderate use" engines that operate less than 500 hours per year could pay 60% of the annual operating fee, as long as quarterly hour meter readings are submitted.
5. **Prohibiting Tier 0 and Tier 1 engines within 50 metres of air intakes for a hospital or a seniors care facility.** Highly sensitive populations, such as the elderly and other at-risk individuals, are particularly vulnerable to the impacts from high emitting Tier 0 and Tier 1 engines.
6. **Adding requirements for some previously exempt emergency engines.** Labelling and registration would not be required, but operators would have to demonstrate proper maintenance and possibly modify exhaust stacks to ensure nearby people are not impacted by diesel emissions.
7. **Adding requirements for some emission reduction measures (ERMs).** Emission reduction measures with ongoing maintenance or activation needs would have additional reporting requirements.
8. **Adding fees for assessing novel emission reduction measures.** A fee of $2,000, payable by the ERM manufacturer/supplier, would help recover the time required for Metro Vancouver assessment of novel emission reduction technologies.

Registration and Labelling of Tier 2 and Tier 3 Non-Road Diesel Engines from 2022

While Tier 2 and Tier 3 engines emit less DPM and NOx than Tier 0 and Tier 1 engines, they emit substantial quantities of these air contaminants as can be seen from Tables 2 and 3 in Appendix A, which show the DPM and NOx emission standards by horsepower (HP) and year of manufacture. It is proposed to expand the scope of Bylaw 1161 to include Tier 2 and Tier 3 engines beginning in 2022.

Table 1 in Appendix A shows the current emission standards in Bylaw 1161, but Tier 0 "standards" are proposed to be adjusted to better reflect the difference in emissions from engines with no emission controls, and those with some emission controls.

The proposed bylaw amendments would require the registration and labelling of Tier 2 and 3 non-road diesel engines in order for these engines to be allowed to operate in the region.

The proposed fees for Tier 2 and Tier 3 engines, based upon emission standards, are shown in Appendix A Tables 5 and 6. Appendix A, Table 5 shows the fees associated with DPM emissions, while Appendix A, Table 6 shows the proposed fees associated with NOx emissions. The DPM and NOx fees used for registered Tier 0 and Tier 1 engines in 2022 are also shown in these tables. Table 7 in Appendix A shows the total proposed fees in $/HP, based on $/tonne, for both DPM and NOx combined.

To see the impact of proposed fees for specific non-road diesel engines, use the online consultation fee calculator.

Registration and Labelling of Tier 4 in 2025 Non-Road Diesel Engines

Tier 4 and Tier 4 interim engines represent the lowest emissions for non-road diesel engines. However, these engines contribute to the amount of DPM and NOx emitted to the environment. As more options for electric engines, charging infrastructure and alternative fuels, such as natural gas, are being developed, a registration program with fees for Tier 4 engines would encourage a shift away from diesel use in non-road engines. Metro Vancouver proposes that Tier 4 engines be included in the bylaw, with registration and labelling beginning in 2025. This proposed change is seen as necessary to achieve Metro Vancouver's air quality and climate change goals. Other jurisdictions have set targets to eliminate the use of diesel, such as the "Diesel-Free by 2033" initiative of the Bay Area Air Quality Management District in California. It is proposed that the emission fees for Tier 4 engines be based upon the same $/tonne as other Tiers. Appendix A, Tables 8, 9 and 10 show the fees for all Tiers of non-road diesel engines beginning in 2025.

Adjustments to Economic Instruments

Bylaw 1161 uses economic instruments to both encourage improvements in emissions from non-road diesel engines operating in the region and to recover the costs of developing and implementing the Bylaw, through the collection of registration fees from engine operators. To support these objectives, the following adjustments to current fees and rebates are proposed.

Expanding the Scope of the Bylaw to Include Nitrogen Oxides Emission Fees

Emissions from all tiers of non-road diesel engines include NOx and fine particulate matter ($PM_{2.5}$) in the form of DPM. Bylaw 1161 currently calculates fees based on DPM emissions from non-road diesel engines, which was the original focus of the program. Recent studies have identified NOx as more harmful to human health and the environment than previously determined. A Metro Vancouver commissioned study to assess the health benefit of reducing emissions of various air contaminants determined that health benefits from reducing NOx emissions were in the range of $30,000 per tonne.

Non-road diesel engines are built to meet specific NOx emission standards. Recognizing that engines should emit less than the standards and also do not operate continuously, and while permitted facilities are currently charged $50/tonne of the potential NOx to be emitted, given recent studies noted above, it is proposed that the NOx non-road diesel fee be set at $150/tonne of the potential NOx that could be emitted.

Metro Vancouver recognizes a sudden increase to $150/tonne would be substantial. Consequently, to provide an opportunity for industry to adjust, an interim emission fee of $90/tonne is proposed beginning in 2022 and a $150/tonne fee is proposed beginning in 2025.

Proposed DPM Emissions Fee Adjustments

The estimated health benefits associated with reduced diesel particulate emissions were derived from a United States Environmental Protection Agency (US EPA) 2019 study titled, "Monetized Health Benefits Attributable to Mobile Emissions Reductions Across the United States in 2025". The estimated health benefit of reducing DPM emissions in the western United States was estimated at roughly $1,000,000 (Canadian) per tonne. Values from the western United States were considered the most appropriate comparison for Metro Vancouver.

Metro Vancouver proposes setting the DPM fee at a level that is proportional to the health benefits of the ratio of DPM:NOx emission reductions, which is $1,000,000/$30,000 or 33 times. This sets the 2022 DPM fee at $2,970/tonne and the 2025 DPM fee $4,950/tonne. Figure 2 below shows the summary of the proposed non-road diesel engine emissions fees based on a hypothetical average engine fee per horsepower for the various tiers for comparison purposes. Actual fees per horsepower within each tier will vary depending upon the horsepower range.

FIGURE 2: EXAMPLE OF PROPOSED NRDEE EMISSION FEES - TIER AVERAGES IN $/HP

	Current, T0 and T1 only			2022 Proposed, +T2/T3			2025 Proposed, +T4		
	DPM	NOx	combined $/HP	DPM	NOx	combined $/HP	DPM	NOx	combined $/HP
T0	$ 20		$ 20	$ 44	$ 10	$ 54	$ 74	$ 16	$ 90
T1	$ 10		$ 10	$ 17	$ 5	$ 23	$ 29	$ 9	$ 38
T2				$7	$ 3	$ 10	$ 11	$ 6	$17
T3				$7	$ 3	$ 9	$ 11	$ 4	$ 15
T4							$ 1	$2	$ 3
$/tonne	varies*	$ 50		$ 2,970	$ 90		$ 4,950	$ 150	

Setting Fees Based on Emission Standards

The US EPA set up a tier system to describe emission standards for non-road diesel engines. Within this system the Tier 0 engine category is based on emissions factors, whereas Tier 1, 2, 3, 4 engines have set emissions standards that are progressively more stringent. For simplicity, Metro Vancouver's current Bylaw charges fees based upon the Tier of the engine and the horsepower (HP). For example, in 2020 all Tier 0 engines are charged $20/HP for an annual operating permit. Similarly, all Tier 1 engines are charged $10/HP for an annual operating period in 2020.

The EPA set different emission standards for different horsepower groups within a Tier. For example, as shown in Table 1 of Appendix A, the DPM emission standard for Tier 1 engines in the 50-74 HP range is 1.09 grams/HP-hour while the DPM emission standard for Tier 1 engines in the 300-599 HP range is 0.4 grams/HP-hour. To date, Metro Vancouver DPM Fees have been determined based upon an engine tier rather than the horsepower range and year of the engine. Currently to determine the appropriate fee, engine owners or operators are required to input the engine year and the horsepower into Metro Vancouver's online registration system. The online registration system uses the year and the horsepower to determine the engine tier and calculate the

registration fee tier-based method. To ensure engine owners and operators pay fees based on emissions, Metro Vancouver proposes to change the method of calculating fees from tier-based to a fee based upon emission standards (emissions-based method). Setting fees based on emission standards would be a more equitable approach, as the pollutants emitted will determine the amount of the fee, rather than fees being determined by the engine tier and horsepower. Appendix A, Table 2 and 3, show the emission standards for various engine years and horsepower ranges for both DPM and NOx respectively. Appendix A, Table 4 shows the current fees for DPM in dollars/HP.

Tier 0 engines do not have any emission standards, consequently unlike the higher engine tiers, fees cannot be calculated based on emission standards for Tier 0 engines. There are emission estimates also known as emission factors for Tier 0 engines. There are also emission factors for Tier 1 engines. The emission factors for Tier 1 engines are roughly one half the level of the Tier 1 emission standard. Consequently, it is proposed that the emission factors for Tier 0 engines be doubled to act as a pseudo emission standard for fee calculation purposes. This adjustment for Tier 0 engines is necessary to treat all engines fairly, as the emission factors in the current bylaw for some Tier 0 engines with no emission controls, are lower than emission standards for some Tier 1 engines that are basically the same engines with added emission reduction controls.

Adjustments to the Rebate Mechanism

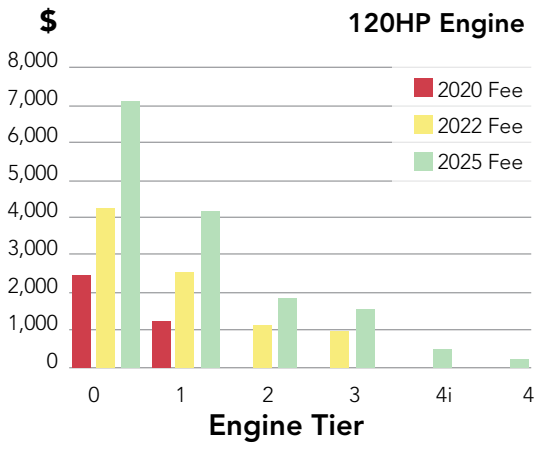
Currently, Bylaw 1161 uses economic instruments to encourage registrants to reduce emissions. Registered engines pay fees proportional to the engine horsepower and emissions. In addition, by permanently retiring a Tier 0 or Tier 1 engine from the Metro Vancouver region or upgrading the engine to a Tier 2 level or higher, engine owners can apply for a rebate of up to 80% of the registration fees paid for that engine over the last three years. Metro Vancouver is proposing the following changes to the mechanism for determining and allocating rebates.

Increasing the Maximum Allowable Rebate Period from Three to Five Years

The current rebate program has successfully supported the removal of polluting engines from the region. However, the fees avoided, plus the rebate of up to 80% of the fees paid over the last three years, have not proven to be sufficient incentive to substantially reduce the number of higher emitting engines. Metro Vancouver would like to encourage a turnover of higher emitting engines, to reduce emissions of harmful diesel emissions in the region, and increase participation in the rebate program. Metro Vancouver proposes increasing the maximum rebate period from three to five years, in combination with higher fees. Figure 3 provides an example of the fees and rebates associated with a 120 HP engine, as these represent a large portion of the engines within the Metro Vancouver non-road diesel registration system.

FIGURE 3: FEE IMPACT ON 120HP ENGINE

Engine Year	Engine Tier	DPM g/HP h	NOx g/HP h	2020 Fee	2022 Fee	2025 Fee
1989	0	1.08	9.3	$2,400	$4,252	$7,086
1999	1	0.6	6.9	$1,200	$2,526	$4,210
2004	2	0.22	4.3		$1,094	$1,823
2009	3	0.22	2.6		$ 933	$1,555
2012	4i	0.015	2.5			$472
2019	4	0.015	0.3			$125
Rebate				80% of 3 years	80% of 3 years	80% of 5 years



As the proposed changes to Bylaw 1161 would include DPM and NOx fees, there will be an ability to install emission reduction measures that target either or both of these pollutants. It is proposed that the rebate available for installing emission reduction measures be equivalent to up to 80% of the emission reduction achieved for three years until 2025 and then for five years. For example, after 2025, an operator reducing their DPM by 90% by installing a diesel particulate filter (DPF) could receive a maximum of 72% (90% of 80%) of DPM fees paid over the prior five years. Going forward, annual operating fees would be based on the lower emission rate achieved by the ERM installation.

Figure 4 shows an example rebate amount that would be refunded in either 2020 or 2030 when a 1989 120HP engine (Tier 0) installs either an emission reduction measure, or upgrades to a cleaner Tier 4 engine.

FIGURE 4: FEE REFUNDS BASED ON LEVEL OF UPGRADE

120HP, 1989, T0 engine	add DOC*		add DPF**		retire T0, replace with T4	
	2020	2030	2020	2030	2020	2030
refund level	80%	80%	80%	80%	80%	80%
refund years	3	5	3	5	3	5
fees refunded	$ 2,880	$ 5,845	$ 5,760	$ 20,815	$ 5,760	$ 28,345

*Diesel Oxidation Catalyst (DOC): Exhaust after-treatment device
**Diesel Particulate Filters (DPF) Exhaust after-treatment device

Expanding the Scope of the Bylaw to Include a Moderate Use Category

The current bylaw includes provisions for registering an engine as low use, i.e. operating a maximum of 200 hours in a year, at 25% of the cost of a full year operating period. Staff propose to add a moderate use category, whereby an engine operating for a maximum of 500 hours per year will register and pay fees at 60% of the cost of a full year operating period. Similar to the low-use requirements, moderate use engine registrants will need to submit reports at the end of the calendar quarter through the online registration system and display a functioning non-resettable hour meter. As a result, low and moderate-use registrants would report to Metro Vancouver four times per year.

Expanding the Scope to Include Emergency Engines

Most emergency non-road diesel engines are emergency generators in buildings with elevators. These were exempted in the initial bylaw, as they operate infrequently, typically a few hours per month under testing mode. However, because these engines sit idle for long periods of time, they can have substantial emissions that impact nearby people. Consequently, it is proposed that emergency engines be included in Bylaw 1161, whereby operators will be required to undertake necessary engine maintenance and repairs to prevent excessive diesel emissions. Additionally, operators of emergency engines will be required to modify the exhaust stack configuration to meet Good Engineering Practices and to ensure proper dispersion of emissions. Emergency standby generators would still be exempt from the registration and labeling requirements.

Restriction of Tier 0 and Tier 1 Engines near Sensitive Receptors

There is no known safe level for DPM or NO_2 ambient concentrations, and the health impacts of these emissions are most significant for children, the elderly and people with pre-existing respiratory conditions. To protect the health of vulnerable communities, also known as "sensitive receptors", in locations where they could be exposed to NO_2 and DPM emissions from non-road diesel engines, Metro Vancouver proposes that Tier 0 and Tier 1 engines be prohibited from discharging emissions within 50 metres of any air intake for senior's care facilities, extended care facilities, hospitals and other facilities accommodating numerous at-risk individuals (very sensitive receptors).

Additional Requirements for some Emission Reduction Measures

The current bylaw includes a mechanism to approve Emissions Reduction Measures (ERM) to accommodate emerging emission reduction technologies, such as engine retrofits to low-emission fuels, hybrid engines, and electrification. The proposed amendments would require quarterly reporting of continued use of ERMs that depend on ongoing activation or use of a new technology, such as injection of fuel additives to reduce emissions or the use of anti-idling technology, with accompanying evidence such as receipts or meter logged hours of operation of emission reducing systems.

Fees for the Assessment of an Engine Emission Reduction Measure

Registration fees can be significantly reduced by installing an approved emission reduction measure that brings an engine to a higher tier. However, each application by a technology provider requires Metro Vancouver staff time to carry out an assessment of new technology's level of emission reduction, which is proposed to be recovered through a fee of $2,000. This fee is based on the historically demonstrated level of effort required by Metro Vancouver to assess novel emission reduction measures. These fees would not apply to proven technologies such as those verified by the California Air Resources Board (CARB) or the US Environmental Protection Agency (US EPA).

Providing Feedback and Comments

Metro Vancouver is seeking feedback on the proposals outlined in this discussion paper to expand the scope of Bylaw 1161, and will consider all input in the development of amendments to Bylaw 1161. The MVRD Board will receive a summary of the feedback obtained during consultation.

Metro Vancouver staff and contractors will treat comments received with confidentiality; however, please note that comments you provide and information that identifies you as the source of those comments may be publicly available if a freedom of information (FOI) request is made under the *Freedom of Information and Protection of Privacy Act*. If you have any questions or comments regarding the consultation process, please call 604-432-6200.

Metro Vancouver invites you to provide feedback by December 13, 2020 by email to DieselBylaw@metrovancouver.org or through feedback and engagement opportunities featured on Metro Vancouver's website. Following the consultation process, Metro Vancouver will consider all concerns received. All feedback received will be considered until the MVRD Board makes a decision on proposed amendments to Bylaw 1161.

Visit www.metrovancouver.org/nonroaddiesel for more information. Sign-up for the project mailing list to ensure you receive updates and notification about engagement opportunities.

Appendix A

TABLE 1: CURRENT DIESEL PARTICULATE MATTER EMISSIONS STANDARDS BY HORSEPOWER, BYLAW 1161, 2012

Engine Year	DPM STANDARDS - ENGINE HORSEPOWER GROUPS, g/HP-hr								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	0.95	1.2	1.2	1.1	1.1	0.95	0.95	0.95	0.84
1969	0.95	1.2	1.2	1.1	1.1	0.95	0.95	0.95	0.84
1970	0.95	1.2	1.2	0.94	0.94	0.81	0.81	0.81	0.84
1972	0.95	1.2	1.2	0.78	0.78	0.68	0.68	0.68	0.84
1973	0.95	1.2	1.2	0.78	0.78	0.68	0.68	0.68	0.72
1988	0.95	1.2	1.2	0.78	0.54	0.49	0.49	0.5	0.72
1989	0.95	1.2	1.2	0.78	0.54	0.49	0.49	0.5	0.72
1996	0.95	1.2	1.2	0.78	0.4	0.4	0.4	0.5	0.72
1997	0.95	1.2	1.2	0.6	0.4	0.4	0.4	0.5	0.72
1998	0.95	1.09	1.09	0.6	0.4	0.4	0.4	0.5	0.72
1999	0.6	1.09	1.09	0.6	0.4	0.4	0.4	0.5	0.72
2000	0.6	1.09	1.09	0.6	0.4	0.4	0.4	0.4	0.72
2001	0.6	1.09	1.09	0.6	0.4	0.15	0.4	0.4	0.72
2002	0.6	1.09	1.09	0.6	0.4	0.15	0.15	0.4	0.54
2003	0.6	1.09	1.09	0.22	0.15	0.15	0.15	0.4	0.54
2004	0.45	0.3	0.3	0.22	0.15	0.15	0.15	0.4	0.54
2005	0.45	0.3	0.3	0.22	0.15	0.15	0.15	0.4	
2006	0.45	0.3	0.3	0.22	0.15	0.15	0.15	0.15	
2007	0.45	0.3	0.3	0.22	0.15	0.15	0.15	0.15	
2008	0.22	0.22	0.3	0.22	0.15	0.15	0.15	0.15	
2009	0.22	0.22	0.3	0.22	0.15	0.15	0.15	0.15	
2010	0.22	0.22	0.3	0.22	0.15	0.15	0.15	0.15	
2011	0.22	0.22	0.3	0.22	0.015	0.015	0.015	0.07	
2012	0.22	0.22	0.015	0.015	0.015	0.015	0.015	0.07	
2013	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.07	
2014	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.07	
2015	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	
2016	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	
2017	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	
2018	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	
2019	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	
2020	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	

Tier 0	Tier 1	Tier 2	Tier 3	Tier 4 (interim)	Tier 4

TABLE 2: DIESEL PARTICULATE MATTER EMISSIONS STANDARDS BY HORSEPOWER

Engine Year	DPM STANDARDS - ENGINE HORSEPOWER GROUPS g/HP-hr								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	1.9	2.4	2.4	2.20	2.2	1.9	1.9	1.9	1.68
1969	1.9	2.4	2.4	2.20	2.2	1.9	1.9	1.9	1.68
1970	1.9	2.4	2.4	1.88	1.88	1.62	1.62	1.62	1.68
1972	1.9	2.4	2.4	1.56	1.56	1.36	1.36	1.36	1.68
1973	1.9	2.4	2.4	1.56	1.56	1.36	1.36	1.36	1.44
1988	1.9	1.96	1.96	1.08	1.08	0.98	0.98	1.00	1.44
1989	1.9	1.96	1.96	1.08	1.08	0.98	0.98	1.00	0.98
1996	1.9	1.96	1.96	1.08	0.4	0.4	0.4	1.00	1.00
1997	1.9	1.96	1.96	0.6	0.4	0.4	0.4	1.00	1.00
1998	1.9	1.09	1.09	0.6	0.4	0.4	0.4	1.00	1.00
1999	0.6	1.09	1.09	0.6	0.4	0.4	0.4	1.00	1.00
2000	0.6	1.09	1.09	0.6	0.4	0.4	0.4	0.4	0.4
2001	0.6	1.09	1.09	0.6	0.4	0.15	0.4	0.4	0.4
2002	0.6	1.09	1.09	0.6	0.4	0.15	0.15	0.4	0.4
2003	0.6	1.09	1.09	0.22	0.15	0.15	0.15	0.4	0.4
2004	0.45	0.3	0.3	0.22	0.15	0.15	0.15	0.4	0.4
2005	0.45	0.3	0.3	0.22	0.15	0.15	0.15	0.4	0.4
2006	0.45	0.3	0.3	0.22	0.15	0.15	0.15	0.15	0.15
2007	0.45	0.3	0.3	0.22	0.15	0.15	0.15	0.15	0.15
2008	0.22	0.22	0.3	0.22	0.15	0.15	0.15	0.15	0.15
2009	0.22	0.22	0.3	0.22	0.15	0.15	0.15	0.15	0.15
2010	0.22	0.22	0.3	0.22	0.15	0.15	0.15	0.15	0.15
2011	0.22	0.22	0.3	0.22	0.015	0.015	0.015	0.07	0.07
2012	0.22	0.22	0.015	0.015	0.015	0.015	0.015	0.07	0.07
2013	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.07	0.07
2014	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.07	0.07
2015	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	0.03
2016	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	0.03
2017	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	0.03
2018	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	0.03
2019	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	0.03
2020	0.02	0.02	0.015	0.015	0.015	0.015	0.015	0.03	0.03

Tier 0	Tier 1	Tier 2	Tier 3	Tier 4 (interim)	Tier 4

TABLE 3: NITROGEN OXIDES EMISSIONS STANDARDS BY HORSEPOWER

Engine Year	NOx STANDARDS - ENGINE HORSEPOWER GROUPS g/HP-hr								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	7.2	14.8	14.8	15.9	15.9	15.2	15.2	15.2	15.2
1969	7.2	14.8	14.8	15.9	15.9	15.2	15.2	15.2	15.2
1970	7.2	14.8	14.8	14.8	14.8	14.1	14.1	14.1	14.1
1972	7.2	14.8	14.8	13.6	13.6	13.0	13.0	13.0	13
1973	7.2	14.8	14.8	13.6	13.6	13.0	13.0	13.0	13
1988	7.1	9.9	9.9	9.3	9.3	8.9	8.9	8.9	8.9
1989	7.1	9.9	9.9	9.3	9.3	8.9	8.9	8.9	8.9
1996	7.1	9.9	9.9	9.3	6.9	6.9	6.9	8.9	8.9
1997	7.1	9.9	9.9	6.9	6.9	6.9	6.9	8.9	8.9
1998	7.1	6.9	6.9	6.9	6.9	6.9	6.9	8.9	8.9
1999	6.2	6.9	6.9	6.9	6.9	6.9	6.9	8.9	8.9
2000	6.2	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
2001	6.2	6.9	6.9	6.9	6.9	4.2	6.9	6.9	6.9
2002	6.2	6.9	6.9	6.9	6.9	4.2	4.2	6.9	6.9
2003	6.2	6.9	6.9	4.3	4.3	4.2	4.2	6.9	6.9
2004	4.9	4.9	4.9	4.3	4.3	4.2	4.2	6.9	6.9
2005	4.9	4.9	4.9	4.3	4.3	4.2	4.2	6.9	6.9
2006	4.9	4.9	4.9	4.3	2.6	2.6	2.6	4.2	4.2
2007	4.9	4.9	4.9	2.6	2.6	2.6	2.6	4.2	4.2
2008	4.9	3	3	2.6	2.6	2.6	2.6	4.2	4.2
2009	4.9	3	3	2.6	2.6	2.6	2.6	4.2	4.2
2010	4.9	3	3	2.6	2.6	2.6	2.6	4.2	4.2
2011	4.9	3	3	2.6	1.5	1.5	1.5	2.6	2.6
2012	4.9	3	2.5	2.5	1.5	1.5	1.5	2.6	2.6
2013	3	3	2.5	2.5	1.5	1.5	1.5	2.6	2.6
2014	3	3	2.5	2.5	0.3	0.3	0.3	2.6	2.6
2015	3	3	0.3	0.3	0.3	0.3	0.3	2.6	2.6
2016	3	3	0.3	0.3	0.3	0.3	0.3	2.6	2.6
2017	3	3	0.3	0.3	0.3	0.3	0.3	2.6	2.6
2018	3	3	0.3	0.3	0.3	0.3	0.3	2.6	2.6
2019	3	3	0.3	0.3	0.3	0.3	0.3	2.6	2.6
2020	3	3	0.3	0.3	0.3	0.3	0.3	2.6	2.6

Tier 0	Tier 1	Tier 2	Tier 3	Tier 4 (interim)	Tier 4

TABLE 4: CURRENT FEE FOR DIESEL PARTICULATE MATTER IN $/HP. BASED ON TIER LEVEL

Engine Year	DPM fees, ENGINE HORSEPOWER GROUPS, $/HP								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	20	20	20	20	20	20	20	20	20
1969	20	20	20	20	20	20	20	20	20
1970	20	20	20	20	20	20	20	20	20
1972	20	20	20	20	20	20	20	20	20
1973	20	20	20	20	20	20	20	20	10
1988	20	20	20	20	20	20	20	20	10
1989	20	20	20	20	20	20	20	20	10
1996	20	20	20	20	10	10	10	20	10
1997	20	20	20	10	10	10	10	20	10
1998	20	10	10	10	10	10	10	20	10
1999	10	10	10	10	10	10	10	20	10
2000	10	10	10	10	10	10	10	10	10
2001	10	10	10	10	10		10	10	10
2002	10	10	10	10	10			10	
2003	10	10	10					10	
2004								10	
2005								10	
2006									

Tier 0	Tier 1	Tier 2	Tier 3	Tier 4 (interim)	Tier 4

TABLE 5: PROPOSED 2022 DIESEL PARTICULATE MATTER FEES IN $/HP - BASED ON $2,970/TONNE DPM

Engine Year	DPM fees, ENGINE HORSEPOWER GROUPS, $/HP								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	49	62	62	57	57	49	49	49	44
1969	49	62	62	57	57	49	49	49	44
1970	49	62	62	49	49	42	42	42	44
1972	49	62	62	41	41	35	35	35	44
1973	49	62	62	41	41	35	35	35	37
1988	49	51	51	28	28	25	25	26	37
1989	49	51	51	28	28	25	25	26	25
1996	49	51	51	28	10	10	10	26	26
1997	49	51	51	16	10	10	10	26	26
1998	49	28	28	16	10	10	10	26	26
1999	16	28	28	16	10	10	10	26	26
2000	16	28	28	16	10	10	10	10	10
2001	16	28	28	16	10	4	10	10	10
2002	16	28	28	16	10	4	4	10	10
2003	16	28	28	6	4	4	4	10	10
2004	12	8	8	6	4	4	4	10	10
2005	12	8	8	6	4	4	4	10	4
2006	12	8	8	6	4	4	4	4	4
2007	12	8	8	6	4	4	4	4	4
2008			8	6	4	4	4	4	4
2009			8	6	4	4	4	4	4
2010			8	6	4	4	4	4	4
2011			8	6					
2012									

Tier 0		Tier 1		Tier 2		Tier 3		Tier 4 (interim)		Tier 4	

TABLE 6: PROPOSED 2022 NITROGEN OXIDES FEES IN $/HP - BASED ON $90/TONNE NOX

Engine Year	NOx fees, ENGINE HORSEPOWER GROUPS, $/HP								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	6	12	12	13	13	12	12	12	12
1969	6	12	12	13	13	12	12	12	12
1970	6	12	12	12	12	11	11	11	11
1972	6	12	12	11	11	10	10	10	10
1973	6	12	12	11	11	10	10	10	5
1988	6	8	8	7	7	7	7	7	5
1989	6	8	8	7	7	7	7	7	5
1996	6	8	8	7	5	5	5	7	5
1997	6	8	8	5	5	5	5	7	5
1998	6	5	5	5	5	5	5	7	5
1999	5	5	5	5	5	5	5	7	5
2000	5	5	5	5	5	5	5	5	5
2001	5	5	5	5	5	3	5	5	5
2002	5	5	5	5	5	3	3	5	3
2003	5	5	5	3	3	3	3	5	3
2004	4	4	4	3	3	3	3	5	3
2005	4	4	4	3	3	3	3	5	2
2006	4	4	4	3	2	2	2	3	2
2007	4	4	4	2	2	2	2	3	2
2008			2	2	2	2	2	3	2
2009			2	2	2	2	2	3	2
2010			2	2	2	2	2	3	2
2011			2	2					
2012									

Tier 0	Tier 1	Tier 2	Tier 3	Tier 4 (interim)	Tier 4

TABLE 7: PROPOSED 2022 TOTAL FEES (DIESEL PARTICULATE MATTER + NITROGEN OXIDES) IN $/HP - BASED ON $/TONNE

Engine Year	DPM + NOx fees, ENGINE HORSEPOWER GROUPS, $/HP								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	55	74	74	70	70	61	61	61	56
1969	55	74	74	70	70	61	61	61	56
1970	55	74	74	61	61	53	53	53	55
1972	55	74	74	51	51	46	46	46	54
1973	55	74	74	51	51	46	46	46	42
1988	55	59	59	35	35	33	33	33	42
1989	55	59	59	35	35	33	33	33	30
1996	55	59	59	35	16	16	16	33	31
1997	55	59	59	21	16	16	16	33	31
1998	55	34	34	21	16	16	16	33	31
1999	20	34	34	21	16	16	16	33	31
2000	20	34	34	21	16	16	16	16	15
2001	20	34	34	21	16	7	16	16	15
2002	20	34	34	21	16	7	7	16	13
2003	20	34	34	9	7	7	7	16	13
2004	16	12	12	9	7	7	7	16	13
2005	16	12	12	9	7	7	7	16	6
2006	16	12	12	9	6	6	6	7	6
2007	16	12	12	8	6	6	6	7	6
2008			10	8	6	6	6	7	6
2009			10	8	6	6	6	7	6
2010			10	8	6	6	6	7	6
2011			10	8					
2012									

Tier 0	Tier 1	Tier 2	Tier 3	Tier 4 (interim)	Tier 4

TABLE 8: PROPOSED 2025 DIESEL PARTICULATE MATTER FEES IN $/HP - BASED ON $4,950/TONNE DPM

Engine Year	DPM fees, ENGINE HORSEPOWER GROUPS, $/HP								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	82	104	104	95	95	82	82	82	73
1969	82	104	104	95	95	82	82	82	73
1970	82	104	104	82	82	70	70	70	73
1972	82	104	104	68	68	59	59	59	73
1973	82	104	104	68	68	59	59	59	62
1988	82	85	85	47	47	42	42	43	62
1989	82	85	85	47	47	42	42	43	42
1996	82	85	85	47	17	17	17	43	43
1997	82	85	85	26	17	17	17	43	43
1998	82	47	47	26	17	17	17	43	43
1999	26	47	47	26	17	17	17	43	43
2000	26	47	47	26	17	17	17	17	17
2001	26	47	47	26	17	7	17	17	17
2002	26	47	47	26	17	7	7	17	17
2003	26	47	47	10	7	7	7	17	17
2004	20	13	13	10	7	7	7	17	17
2005	20	13	13	10	7	7	7	17	7
2006	20	13	13	10	7	7	7	7	7
2007	20	13	13	10	7	7	7	7	7
2008	10	10	13	10	7	7	7	7	7
2009	10	10	13	10	7	7	7	7	7
2010	10	10	13	10	7	7	7	7	7
2011	10	10	13	10	0.7	0.7	0.7	3	3
2012	10	10	0.7	0.7	0.7	0.7	0.7	3	3
2013	0.9	0.9	0.7	0.7	0.7	0.7	0.7	3	3
2014	0.9	0.9	0.7	0.7	0.7	0.7	0.7	3	3
2015	0.9	0.9	0.7	0.7	0.7	0.7	0.7	1.3	1.3
2016	0.9	0.9	0.7	0.7	0.7	0.7	0.7	1.3	1.3
2017	0.9	0.9	0.7	0.7	0.7	0.7	0.7	1.3	1.3
2018	0.9	0.9	0.7	0.7	0.7	0.7	0.7	1.3	1.3
2019	0.9	0.9	0.7	0.7	0.7	0.7	0.7	1.3	1.3
2020	0.9	0.9	0.7	0.7	0.7	0.7	0.7	1.3	1.3

Tier 0	Tier 1	Tier 2	Tier 3	Tier 4 (interim)	Tier 4

TABLE 9: PROPOSED 2025 NITROGEN OXIDES EMISSION FEES IN $/HP- BASED ON $150/TONNE NOX

Engine Year	NOx fees, ENGINE HORSEPOWER GROUPS, $/HP								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	9	19	19	21	21	20	20	20	20
1969	9	19	19	21	21	20	20	20	20
1970	9	19	19	19	19	19	19	19	19
1972	9	19	19	18	18	17	17	17	17
1973	9	19	19	18	18	17	17	17	9
1988	9	13	13	12	12	12	12	12	9
1989	9	13	13	12	12	12	12	12	9
1996	9	13	13	12	9	9	9	12	9
1997	9	13	13	9	9	9	9	12	9
1998	9	9	9	9	9	9	9	12	9
1999	8	9	9	9	9	9	9	12	9
2000	8	9	9	9	9	9	9	9	9
2001	8	9	9	9	9	6	9	9	9
2002	8	9	9	9	9	6	6	9	6
2003	8	9	9	6	6	6	6	9	6
2004	6	6	6	6	6	6	6	9	6
2005	6	6	6	6	6	6	6	9	3
2006	6	6	6	6	3	3	3	6	3
2007	6	6	6	3	3	3	3	6	3
2008	6	4	4	3	3	3	3	6	3
2009	6	4	4	3	3	3	3	6	3
2010	6	4	4	3	3	3	3	6	3
2011	6	4	4	3	2	2	2	3	3
2012	6	4	3.3	3.3	2	2	2	3	3
2013	3.9	3.9	3.3	3.3	2	2	2	3	3
2014	3.9	3.9	3.3	3.3	0.4	0.4	0.4	3	3
2015	3.9	3.9	0.4	0.4	0.4	0.4	0.4	3.4	3.4
2016	3.9	3.9	0.4	0.4	0.4	0.4	0.4	3.4	3.4
2017	3.9	3.9	0.4	0.4	0.4	0.4	0.4	3.4	3.4
2018	3.9	3.9	0.4	0.4	0.4	0.4	0.4	3.4	3.4
2019	3.9	3.9	0.4	0.4	0.4	0.4	0.4	3.4	3.4
2020	3.9	3.9	0.4	0.4	0.4	0.4	0.4	3.4	3.4

Tier 0	Tier 1	Tier 2	Tier 3	Tier 4 (interim)	Tier 4

TABLE 10: PROPOSED 2025 TOTAL FEES (DIESEL PARTICULATE MATTER + NITROGEN OXIDES) IN $/HP - BASED ON $/TONNE

Engine Year	DPM + NOx fees, ENGINE HORSEPOWER GROUPS, $/HP								
	25≤HP<50	50≤HP<75	75≤HP<100	100≤HP<175	175≤HP<300	300≤HP<600	600≤HP<750	750≤HP<1200	HP≥1,200
pre-1969	92	124	124	116	116	102	102	102	93
1969	92	124	124	116	116	102	102	102	93
1970	92	124	124	101	101	89	89	89	91
1972	92	124	124	86	86	76	76	76	90
1973	92	124	124	86	86	76	76	76	72
1988	92	98	98	59	59	54	54	55	72
1989	92	98	98	59	59	54	54	55	52
1996	92	98	98	59	26	26	26	55	52
1997	92	98	98	35	26	26	26	55	52
1998	92	56	56	35	26	26	26	55	52
1999	34	56	56	35	26	26	26	55	52
2000	34	56	56	35	26	26	26	26	26
2001	34	56	56	35	26	12	26	26	26
2002	34	56	56	35	26	12	12	26	23
2003	34	56	56	15	12	12	12	26	23
2004	26	19	19	15	12	12	12	26	23
2005	26	19	19	15	12	12	12	26	10
2006	26	19	19	15	10	10	10	12	10
2007	26	19	19	13	10	10	10	12	10
2008	16	13	17	13	10	10	10	12	10
2009	16	13	17	13	10	10	10	12	10
2010	16	13	17	13	10	10	10	12	10
2011	16	13	17	13	3	3	3	6	6
2012	16	13	4	4	3	3	3	6	6
2013	4.8	4.8	4	4	3	3	3	6	6
2014	4.8	4.8	4	4	1.0	1.0	1.0	6	6
2015	4.8	4.8	1.0	1.0	1.0	1.0	1.0	4.7	4.7
2016	4.8	4.8	1.0	1.0	1.0	1.0	1.0	4.7	4.7
2017	4.8	4.8	1.0	1.0	1.0	1.0	1.0	4.7	4.7
2018	4.8	4.8	1.0	1.0	1.0	1.0	1.0	4.7	4.7
2019	4.8	4.8	1.0	1.0	1.0	1.0	1.0	4.7	4.7
2020	4.8	4.8	1.0	1.0	1.0	1.0	1.0	4.7	4.7

Tier 0	Tier 1	Tier 2	Tier 3	Tier 4 (interim)	Tier 4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