Environment Canada Environnement Canada

Fleet Average NO_x Emission Performance of 2007 Model Year Light-Duty Vehicles, Light-Duty Trucks and Medium-Duty Passenger Vehicles

In relation to the
On-Road Vehicle and Engine Emission Regulations
under the
Canadian Environmental Protection Act, 1999

Transportation Division
Environment Canada

September 2009

Canada

Disclaimer

This document provides a summary report only. It does not in any way supersede or modify the requirements of the *Canadian Environmental Protection Act, 1999* or the *On-Road Vehicle and Engine Emission Regulations,* made under that Act. In the event of an inconsistency between this document and the Act and/or the Regulations, the Act and the Regulations prevail.

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1 Purpose

The purpose of this report is to:

1. summarize the regulatory requirements related to NO_x fleet averaging for light-duty vehicles, light-duty trucks and medium-duty passenger vehicles under the *On-Road Vehicle and Engine Emission Regulations*;
2. summarize the fleet average NO_x emission performance of individual companies and the overall Canadian fleet for the 2007 model year based on data submitted by companies in their end of model year reports; and,
3. evaluate the effectiveness of the Canadian fleet average NO_x emission program in achieving the environmental performance objectives.

2 Introduction

On January 1, 2004, the *On-Road Vehicle and Engine Emission Regulations* (hereafter referred to as the "Regulations") came into effect under the *Canadian Environmental Protection Act, 1999* (CEPA 1999). These Regulations introduced more stringent national emission standards for on-road vehicles and engines. The Regulations align Canada's emission standards for light-duty vehicles, light-duty trucks, medium-duty passenger vehicles, heavy-duty vehicles, heavy-duty engines and motorcycles with those of the U.S. Environmental Protection Agency (EPA).

The Regulations require that new light-duty vehicles (LDV),[1] light light-duty trucks (LLDT),[2] heavy light-duty trucks (HLDT)[3] and medium-duty passenger vehicles (MDPV),[4] manufactured or imported for sale in Canada, conform to the emission standards associated with one of eleven available "bins" generally known as "Tier 2" bins (1 to 11). Each bin is defined by a specific set of maximum limits for exhaust emissions of oxides of nitrogen (NO_x), non-methane organic gases (NMOG), carbon monoxide (CO), formaldehyde (HCHO) and particulate matter (PM), when measured in accordance with the applicable test procedures. A company's choice of bin to which individual vehicle models are certified in a given model year is limited by the obligation to comply with the fleet average NO_x standards associated with that model year. The emission bins, fleet average NO_x standards, timing of phase-ins and methods of calculating fleet average NO_x values are aligned with the U.S. Tier 2 emission program. There are differences, however, in the structure of the NO_x averaging program in Canada, which is designed to recognize vehicles that are sold concurrently in Canada and the U.S. The regulatory requirements are structured to deliver fleet average emissions comparable to those of the U.S., while minimizing the regulatory burden on companies and enabling the marketing of vehicles in Canada independently from the U.S.

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[1] Light-duty vehicles generally consist of passenger cars.

[2] Light light-duty trucks generally consist of vans, sport utility vehicles and pick-up trucks having a gross vehicle weight rating (GVWR) of 2 722 kg (6 000 pounds) or less.

[3] Heavy light-duty trucks generally comprise vans, sport utility vehicles and pick-up trucks having a GVWR of more than 2 722 kg (6 000 pounds) and up to 3 856 kg (8 500 pounds).

[4] Medium-duty passenger vehicles generally consist of heavier passenger-type vehicles, such as vans and sport utility vehicles having a GVWR greater than 3 856 kg (8 500 pounds) and less than 4 536 kg (10 000 pounds).

The Regulations require that companies submit a report to the Minister of the Environment at the end of each model year containing specific information on the company's fleets and fleet average NO_x emission performance for the model year.

3 Summary of Key Regulatory Elements for Fleet Average NOx Emissions

3.1 Exhaust Emission Bin

The Regulations include, amongst other requirements, technical standards establishing maximum limits on vehicle exhaust emissions. These technical standards correspond to those of the EPA through incorporation by reference to the U.S. Code of Federal Regulations (CFR), to ensure that the specified standards are identical in both countries.

Vehicles are required to comply with emission standards specified for a defined "full useful life". A full useful life is specified in years and as accumulated mileage, whichever comes first, and varies depending on the class or subclass of a vehicle. The full useful life for light-duty vehicles (LDV) and light light-duty trucks (LLDT) is 10 years or 192 000 km (120 000 miles). The full useful life for heavy light-duty trucks (HLDT) and medium-duty passenger vehicles (MDPV) is established at 11 years or 192 000 km (120 000 miles).

Companies certify every vehicle to one of eleven bins, each of which contains standards for oxides of nitrogen (NO_x), non-methane organic gases (NMOG), carbon monoxide (CO), formaldehyde and particulate matter (PM), as presented in Table 1.

Table 1: LDV, LLDT, HLDT and MDPV Full Useful Life Exhaust Emission Standards (grams/mile)

Bin Number	NOx	NMOG	CO	Formaldehyde	PM
11	0.9	0.28	7.3	0.032	0.12
10	0.6	0.156/0.230	4.2/6.4	0.018/0.027	0.08
9	0.3	0.090/0.180	4.2	0.018	0.06
8	0.20	0.125/0.156	4.2	0.018	0.02
7	0.15	0.09	4.2	0.018	0.02
6	0.10	0.09	4.2	0.018	0.01
5	0.07	0.09	4.2	0.018	0.01
4	0.04	0.07	2.1	0.011	0.01
3	0.03	0.055	2.1	0.011	0.01
2	0.02	0.01	2.1	0.004	0.01
1	0.00	0.00	0.0	0.000	0.00

Note: The equivalent limits in units of grams/km are obtained by multiplying the grams/mile value by 0.621.

Bins 8 through 10 contain additional temporary, less stringent standards for certain pollutants and for certain vehicles. Bin 11 is only for medium-duty passenger vehicles and is available up to and including the 2008 model year. Bins 9 and 10 were available for the 2004 to 2006 model years for light-duty vehicles and light light-duty trucks, and up to the 2008 model year for heavy light-duty trucks and medium-duty passenger vehicles. Beginning in the 2009 model year,

applicable standards are limited to bins 1 to 8 for all light-duty vehicles, light-duty trucks and medium-duty passenger vehicles.

3.2 Fleet Average NO_x Standards

The Regulations establish fleet average NO_x standards for the 2004 and later model years. Each new light-duty vehicle, light-duty truck and medium-duty passenger vehicle is required to be certified to one of the bins presented in Table 1, for which there are specific emission standards for NO_x and other pollutants. Based on the number of vehicles in each bin, a company calculates a fleet average NO_x value for each model year.

Table 2 presents the fleet average NO_x standards for a company's fleet[5] of light-duty vehicles and light light-duty trucks and its fleet of heavy light-duty trucks and medium-duty passenger vehicles.

Table 2: Fleet Average NO_x Standards (grams/mile)

Model Year	LDV/LLDT	HLDT/MDPV
2004	0.25	0.53
2005	0.19	0.43
2006	0.13	0.33
2007	0.07	0.20
2008	0.07	0.14
2009	0.07	

Note: A company's combined fleet of LDV, LLDT, HLDT and MDPV of the 2009 and later model years will be subject to a single fleet average NO_x standard of 0.07 grams/mile.

The Canadian fleet average NO_x standards for the phase-in period represent an approach that is equivalent to the corresponding U.S. Tier 2 program. For example, in the 2004 model year, the U.S. rules require that a minimum of 25% of a company's fleet of light-duty vehicles and light light-duty trucks meet a fleet average NO_x standard of 0.07 grams/mile, and the remaining 75% is subject to a fleet average NO_x standard of 0.3 grams/mile. The corresponding Canadian fleet average NO_x standard of 0.25 grams/mile applies to a company's entire fleet of light-duty vehicles and light light-duty trucks of the 2004 model year (i.e. effectively represents the weighted average of the U.S. phase-in). The same approach is applied in the subsequent model years and until the fleet average NOx standards are fully phased-in (i.e., 2007 model year for light-duty vehicles and light light-duty trucks and 2009 model year for light-duty trucks and medium-duty passenger vehicles).

[5] "Fleet" refers only to vehicles of a specific model year that a company manufactures in Canada, or imports into Canada, for the purpose of sale to the first retail purchaser.

As of 2009, when the fleet average NO_x standards are fully phased in, a company's combined fleet of light-duty vehicles, light-duty trucks and medium-duty passenger vehicles will be subject to a single fleet average NO_x standard of 0.07 grams/mile, corresponding to the NO_x standard in bin 5.

The fleet average NO_x standards also serve as the reference point for NO_x emission credits and deficits. The Regulations provide flexibility for a company to exclude its group of EPA certified vehicles that are sold in both Canada and the U.S. from mandatory compliance with the Canadian fleet average NO_x standards. Available elections and credits/deficits are discussed in more detail in sections 3.4 and 3.5 of this document.

3.3 Calculation of Fleet Average NO_x Values

The fleet average NO_x value is calculated in accordance with the following equation:

$$\frac{\sum A \times B}{C} \qquad [1]$$

Where:

A represents the NO_x standard for each full useful life emission bin;

B represents the number of vehicles in the fleet that conform to that NO_x standard; and

C represents the total number of vehicles in the fleet.

Fleet average NO_x values must be rounded to the same number of significant figures that are contained in the total number of vehicles in the fleet in the denominator of equation [1], but to at least three decimal places.

Since fleet average NO_x standards are different for the various regulated classes of vehicles for the 2004–2008 model years, for these years, a company must calculate separate fleet average NO_x values for:

- its fleet of light-duty vehicles and light light-duty trucks; and
- its fleet of heavy light-duty trucks and medium-duty passenger vehicles.

Starting with the 2009 model year, a company is required to calculate only a single fleet average NO_x value for its combined fleet of light-duty vehicles, light-duty trucks and medium-duty passenger vehicles.

3.4 Election for Vehicles Covered by a U.S. EPA Certificate

The objective of the fleet averaging provisions is to create a regulatory framework that achieves a Canadian vehicle fleet emission performance comparable to that of the U.S. The vast majority

of vehicles sold in Canada are vehicles designed for and marketed in the U.S. as well. In developing the fleet averaging provisions, Environment Canada believes that a U.S. fleet designed to meet the U.S. fleet average standard (i.e. 0.07 grams/mile in 2009) will, when sold concurrently in Canada, yield a similar but not necessarily identical result in Canada. An analysis conducted by Environment Canada[6] indicated that, even under extreme scenarios, the variations between Canadian and U.S. fleet averages are expected to be small. Nonetheless, given the large numbers of on-road vehicles in Canada and because vehicles are important contributors to air pollution, Environment Canada believes that an appropriate regulatory framework is necessary to remove the opportunity for individual companies to systematically sell a significant number of higher emitting vehicles in Canada than would be allowed in the U.S. This was judged to be important to provide assurance that the long-term environmental performance of the Canadian fleet will be comparable to that of the U.S. Environment Canada recognized, however, that the Canadian market is not identical to the U.S. Therefore, the Regulations allow a company to elect to exclude the group of vehicles that are sold concurrently in Canada and in the U.S. from the mandatory fleet average standard. A company that chooses to make the election in a model year is subject to the following restrictions:

1. The company cannot include vehicles in the group subject to the election if the total number of vehicles sold in Canada exceeds the total number of vehicles sold in the U.S. under the same certificate of conformity in that model year. This restriction does not apply to vehicles that conform to a full useful life emission bin having a NO_x standard equal to or less than the applicable fleet average NO_x standard for that model year (i.e., achieve better than average emissions).
2. The company must include all eligible vehicles in that group. Thus, a company could not choose to exempt only a portion of its eligible vehicles while allowing others to remain in the portion of their fleet subject to the averaging requirements.
3. The company cannot generate any emission credits or transfer any emission credits to another company in the model year that it chooses to exclude vehicles subject to the election if the average NO_x value for the group of vehicles subject to the election exceeds the applicable fleet average NO_x standard.
4. The company forfeits any emission credits it may have obtained in previous model years if the average NO_x value for the group of vehicles subject to the election exceeds the applicable fleet average NO_x standard.

Environment Canada believes that the various provisions are structured in a manner that will deliver fleet average emissions comparable to the U.S., minimize the regulatory burden on companies and allow companies to market vehicles in Canada independently from the U.S.

3.5 Emission Credits/Deficits

NO_x emission credits/deficits are calculated in accordance with the following equation:

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[6] *Scenario Analysis: Fleet Average NO_x Emissions in Canada.* Transportation Systems Branch, Environment Canada, November, 2002.

$$(A - B) \times C \qquad [2]$$

Where:

A is the fleet average NO_x standard;

B is the average NO_x value in respect of the fleet; and

C is the total number of vehicles in the fleet.

NO_x emission credits/deficits are expressed in units of vehicle-grams per mile and must be rounded to the nearest whole number. NO_x emission credits are obtained when the average NO_x value in respect of a fleet of a specific model year is lower than the fleet average NO_x standard for that model year. NO_x emission deficits are incurred in a specific model year when the average NO_x value in respect of a fleet of a specific model year is higher than the fleet average NO_x standard for that model year.

NO_x emission credits for a specific model year are credited on the last day of that model year and may be used to offset any outstanding NO_x emission deficit, be carried forward to offset a future deficit or be transferred to another company. A deficit must be offset no later than the third model year following the year in which it is incurred. If any part of a NO_x emission deficit for a specific model year is outstanding following the second model year after the model year in which the deficit was incurred, the number of NO_x emission credits required to offset that outstanding deficit in the next model year is 120% of the deficit.

3.6 End of Model Year Reports

The Regulations require that all companies submit a report to the Minister of the Environment no later than May 1 after the end of the model year. The end of model year report must contain detailed information concerning the company's fleets and/or groups of vehicles, including information related to:

- statements of allowable elections made by the company in complying with the fleet average NO_x requirements of the Regulations;
- average NO_x value(s) achieved;
- values used in calculating a fleet average NO_x value;
- calculation of NO_x emission credits and/or deficits;
- balance of credits or deficits;
- credit transfers to or from the company.

4 Summary of Company Fleet Average NOx Emission Performance for the 2007 Model Year

4.1 Scope of Company Reports

Table 3 presents a summary of the companies that submitted a fleet average NO_x report for the 2007 model year in accordance with the requirements of the Regulations, including the vehicle divisions and the number of test groups[7] covered by the company reports.

Table 3: Scope of Company Reports

Company	Divisions	Number of Test Groups
BMW Canada Inc.	BMW, Mini, Rolls-Royce	13
Chrysler Canada Inc.[1]	Chrysler, Dodge, Jeep	28
Ferrari North America, Inc.	Ferrari	2
Ford Motor Company of Canada, Limited	Ford, Lincoln, Mercury	42
General Motors of Canada Limited	Buick, Cadillac, Chevrolet, GMC, Hummer, Pontiac, Saab, Saturn	41
Honda Canada Inc.	Acura, Honda	17
Hyundai Auto Canada	Hyundai	13
Jaguar Canada	Jaguar	4
Kia Canada Inc.	Kia	11
Land Rover Canada	Land Rover	3
Lotus Cars USA Inc.	Lotus	1
Maserati North America, Inc.	Maserati	1
Mazda Canada Inc.	Mazda	13
Mercedes-Benz Canada Inc.	Mercedes, Smart	17
Mitsubishi Motor Sales of Canada Inc.	Mitsubishi	6
Nissan Canada Inc.	Infiniti, Nissan	19
Porsche Cars Canada Ltd.	Porsche	4
Subaru Canada, Inc.	Subaru	4
Suzuki Canada Inc.	Suzuki	5
Toyota Canada Inc.	Lexus, Toyota	25
Volkswagen Canada Inc.	Audi, Bentley, Lamborghini, Volkswagen	20
Volvo Cars of Canada Ltd.	Volvo	5
Total		**294**

[1] *As a result of a change in its ownership, Daimler-Chrysler Canada Inc. became Chrysler Canada Inc. on July 30, 2007. Accordingly, Daimler-Chrysler Canada Inc. was renamed Chrysler Canada Inc. for this report.*

A total of 22 companies submitted reports covering 2007 model year vehicles in 294 test groups.

[7] A test group is the basic classification unit for the purpose of demonstrating compliance with exhaust emission standards and comprises light-duty vehicles, light-duty trucks or medium-duty passenger vehicles having similar exhaust emission performances and that share all of the features described in section 1827, subchapter C, part 86 of the CFR.

4.2 Company Fleet Average NO_x Values

Tables 4 and 5 summarize the total number of vehicles and average NO_x values for each company's fleets of LDV/LLDT and HLDT/MDPV, respectively.

Table 4: Summary of Company Average NO_x Values for the LDV/LLDT Fleet
Fleet Average NO_x Standard = 0.07 grams/mile
Maximum NO_x = 0.2 grams/mile (Bin 8)

Company	Total Number of Vehicles	Average NOx Value (grams/mile)
BMW Canada Inc.	23 569	0.070000
Chrysler Canada Inc.	174 265	0.0750552
Ferrari North America, Inc.	140	0.0700
Ford Motor Company of Canada, Limited	126 464	0.0608375
General Motors of Canada Limited	296 024	0.0699478
Honda Canada Inc.	171 694	0.0693451
Hyundai Auto Canada	86 796	0.064699
Jaguar Canada	1 038	0.07000
Kia Canada Inc.	31 728	0.063869
Lotus Cars USA Inc.	135	0.0700
Maserati North America, Inc.	101	0.0700
Mazda Canada Inc.	86 381	0.070000
Mercedes-Benz Canada Inc.	12 378	0.073442
Mitsubishi Motor Sales of Canada Inc.	8 113	0.07000
Nissan Canada Inc.	66 528	0.070000
Porsche Cars Canada Ltd.	1 106	0.07000
Subaru Canada, Inc.	9 640	0.07000
Suzuki Canada Inc.	13 699	0.065657
Toyota Canada Inc.	223 221	0.0684604
Volkswagen Canada Inc.	45 847	0.070000
Volvo Cars of Canada Ltd.	9 062	0.07000

Note: Fleet average NO_x values are rounded to the same number of significant figures that are contained in the total number of vehicles in the fleet used in equation [1].

Table 5: Summary of Company Average NO_x Values for the HLDT/MDPV Fleet
Fleet Average NO_x Standard = 0.20 grams/mile
Maximum NO_x = 0.9 grams/mile (Bin 11)

Company	Total Number of Vehicles	Average NOx Value (grams/mile)
BMW Canada Inc.	3 567	0.2000
Chrysler Canada Inc.	36 899	0.13630
Ford Motor Company of Canada, Limited	59 686	0.16517
General Motors of Canada Limited	82 430	0.18611
Honda Canada Inc.	5 371	0.07000
Land Rover Canada	1 944	0.07000
Mercedes-Benz Canada Inc.	3 892	0.2752
Nissan Canada Inc.	2 140	0.07000
Toyota Canada Inc.	12 764	0.084208
Volkswagen Canada Inc.	2 429	0.07000

Note: Fleet average NO_x values are rounded to the same number of significant figures that are contained in the total number of vehicles in the fleet used in equation [1].

The company average NO_x values ranged from 0.0608375 grams/mile to 0.0750552 grams/mile for the fleet of LDV/LLDT and 0.07000 grams/mile to 0.2752 grams/mile for the fleet of HLDT/MDPV. The calculated average NO_x values for two of the 21 companies' LDV/LLDT fleets are above the average NO_x standard of 0.07 grams/mile. The calculated average NO_x value for one of the ten companies' HLDT/MDPV fleets is above the average NO_x standard of 0.20 grams/mile. Average NO_x values above the applicable average NO_x standard for a given fleet can be attributed to the following factors:

1. The company elects to exclude from mandatory compliance with the fleet average NO_x standard its group of U.S.-certified vehicles that are sold in Canada and the U.S. This exclusion is allowed because the objective of the fleet averaging provisions is to achieve an overall Canadian vehicle fleet emission performance comparable to that of the U.S., while minimizing the regulatory burden on companies. An analysis conducted by Environment Canada indicated that, even under extreme scenarios, the variations between the Canadian and U.S. fleet averages are expected to be small.
2. The fleet includes a substantial number of diesel-fuelled vehicles. It is recognized that achieving low NO_x levels represents a greater technical challenge for diesel-fuelled vehicles. Diesel engines, however, typically produce lower emissions of non-methane organic gases (NMOG), carbon monoxide (CO) and carbon dioxide (CO_2) relative to comparable gasoline-fuelled vehicles.
3. The average NO_x value of only one of the fleets (LDV/LLDT or HLDT/MDPV) is above the average NO_x standard. A company can average values from the LDV/LLDT and HLDT/MDPV fleets to satisfy the requirements of the average NO_x emission program in Canada.
4. A company obtained NO_x emission credits by achieving better than average NO_x values in previous model years. A company can carry forward NO_x emission credits to offset a deficit in a subsequent model year.

Ferrari North America Inc., Lotus Cars USA, Inc., Maserati North America Inc., Mercedes-Benz Canada Inc., Mitsubishi Motor Sales of Canada, Inc. and Volkswagen Canada Inc. elected to exclude their group of vehicles sold concurrently in Canada and the U.S. from compliance with the fleet average NO_x standard. For Ferrari North America Inc., Lotus Cars USA, Inc., Maserati North America Inc. and Mitsubishi Motor Sales of Canada Inc. the election effectively applies to their entire fleets of 2007 model year vehicles. Mercedes-Benz Canada Inc. and Volkswagen Canada Inc. reported vehicles that do not satisfy all conditions for the election, resulting in a number of vehicles that can not be excluded from compliance with the mandatory fleet average NO_x standard. However, the average NO_x value for their group of vehicles not subject to the election was below the applicable average NO_x standard and therefore neither of the two companies incurred a deficit. The average NO_x values for these companies were reported in this section for information purposes only, and generate no emission credits/deficits in Section 4.3 of this document.

4.3 Emission Credits/Deficits for the 2007 Model Year

Table 6 summarizes the emission credits/deficits obtained by each company for the 2007 model year. Companies that elected to exclude their group of vehicles from compliance with the fleet average NO_x standard, including the calculation of credits, or that did not report vehicles for a particular fleet are assigned "0" credits/deficits. In addition, Mercedes-Benz Canada Inc. forfeited any emission credits it had obtained in previous model years because the average NO_x value for its group of vehicles subject to the election exceeded the applicable fleet average NO_x standard.

Table 6: Emission Credits/Deficits for the 2007 Model Year (vehicle-grams/mile)

Company	LDV/LLDT	HLDT/MDPV	Total MY 2007 Credits
BMW Canada Inc.	0[3]	0[3]	0
Chrysler Canada Inc.	- 881	2 350	1 469
Ferrari North America, Inc.	0[1]	0[2]	0
Ford Motor Company of Canada, Limited	1 159	2 079	3 238
General Motors of Canada Limited	15	1 145	1 160
Honda Canada Inc.	112	698	810
Hyundai Auto Canada	460	0[2]	460
Jaguar Canada	0[3]	0[2]	0
Kia Canada Inc.	195	0[2]	195
Land Rover Canada	0[2]	253	253
Lotus Cars USA Inc.	0[1]	0[2]	0
Maserati North America, Inc.	0[1]	0[2]	0
Mazda Canada Inc.	0[3]	0[2]	0
Mercedes-Benz Canada Inc.	0[1]	0[1]	0
Mitsubishi Motor Sales of Canada Inc.	0[1]	0[2]	0
Nissan Canada Inc.	0[3]	278	278
Porsche Cars Canada Ltd.	0[3]	0[2]	0
Subaru Canada, Inc.	0[3]	0[2]	0
Suzuki Canada Inc.	59	0[2]	59
Toyota Canada Inc.	344	1 478	1 822
Volkswagen Canada Inc.	0[1]	0[1]	0
Volvo Cars of Canada Ltd.	0[3]	0[2]	0
Total	**1 463**	**8 281**	**9 744**

Notes:

A negative sign (−) indicates a deficit.

NO_x emission credits/deficits are rounded to the nearest whole number.

[1] The company elected to exclude its group of vehicles from compliance with the fleet average NO_x standard and/or did not report credits.

[2] The company's fleet did not have any vehicles for the applicable class.

[3] The fleet average NO_x value is equal to the fleet average NO_x standard.

A total of 9 744 credits were obtained for the 2007 model year. No company incurred an overall deficit with respect to their combined 2007 model year fleets.

4.4 End of Model Year Balance of Emission Credits/Deficits

Table 7 shows all activities relating to credits/deficits for the 2007 model year.

Table 7: End of Model Year Balance of Emission Credits/Deficits (vehicle-grams/mile)

Company	Initial Balance	Total 2007 MY Credits	New Balance	Credits Transferred	End of Model Year Balance
BMW Canada Inc.	801	0	801	0	801
Chrysler Canada Inc.	39 024	1 469	40 493	0	40 493
Ferrari North America, Inc.	0	0	0	0	0
Ford Motor Company of Canada, Limited	35 849	3 238	39 087	0	39 087
General Motors of Canada Limited	70 722	1 160	71 882	0	71 882
Honda Canada Inc.	18 749	810	19 559	0	19 559
Hyundai Auto Canada	2 703	460	3 163	0	3 163
Jaguar Canada	126	0	126	0	126
Kia Canada Inc.	4 526	195	4 721	0	4 721
Land Rover Canada	579	253	832	0	832
Lotus Cars USA Inc.	0	0	0	0	0
Maserati North America, Inc.	0	0	0	0	0
Mazda Canada Inc.	14 878	0	14 878	0	14 878
Mercedes-Benz Canada Inc.	113	0	0[1]	0	0
Mitsubishi Motor Sales of Canada Inc.	- 379	0	-379	0	-379
Nissan Canada Inc.	18 332	278	18,610	0	18,610
Porsche Cars Canada Ltd.	370	0	370	0	370
Subaru Canada, Inc.	2 606	0	2 606	0	2 606
Suzuki Canada Inc.	1 190	59	1 249	0	1 249
Toyota Canada Inc.	22 855	1 822	24 677	0	24 677
Volkswagen Canada Inc.	0	0	0	0	0
Volvo Cars of Canada Ltd.	3 538	0	3 538	0	3 538
Total	**236 582**	**9 744**	**246 213**	**0**	**246 213**

Notes:

A negative sign (−) indicates a deficit.

[1] *Since the company made an election for its group of vehicles covered by an EPA certificate and the average NO_x value for the group of vehicles exceeded the applicable fleet average NO_x standard, the company forfeited any emission credits it had obtained in previous model years.*

There are no companies that exchanged or carried forward credits to offset a deficit incurred in the current model year. One company reported a negative balance at the end of the 2007 model year that is a carryover from the previous model year. The company is required to offset the deficit no later than the date the company submits its 2009 end of model year report.

5 NOx Emission Performance of the Canadian Fleet for the 2007 Model Year

5.1 Distribution of LDV, LLDT and HLDT/MDPV

Table 8 summarizes the LDV, LLDT and HLDT/MDPV distribution of the Canadian fleet for the 2007 model year.

Table 8: Distribution of Canadian Fleet

Vehicle Class	Total Number of Vehicles	Percentage of Total Fleet
LDV	951 029	59
LLDT	436 900	27
HLDT/MDPV	211 122	13
Total	**1 599 051**	**100**

A total of 1 387 929 LDV/LLDT and 211 122 HLDT/MDPV were reported for the 2007 model year, for a combined total of 1 599 051 vehicles. The overall Canadian fleet for the 2007 model year was comprised of 59% LDV, 27% LLDT and 13% HLDT/MDPV. This distribution is comparable to previous model years.

5.2 Distribution of Bins and Fleet Average NO_x Values

Table 9 summarizes the distribution of vehicles by NO_x standard (bin) and calculated average NO_x values for each of the LDV/LLDT and HLDT/MDPV fleets for the 2007 model year.

Table 9: Distribution of Vehicles by NO_x Standard (Bin)

Bin Number	NOx Standard (grams/mile)	LDV/LLDT		HLDT/MDPV	
		Total Number of Vehicles in "Bin"	Percentage of Vehicles in "Bin"	Total Number of Vehicles in "Bin"	Percentage of Vehicles in "Bin"
11	0.9	-	-	0	0.00
10	0.6	0	0.00	4 025	1.91
9	0.3	0	0.00	0	0.00
8	0.20	9 591	0.69	132 115	62.58
7	0.15	0	0.00	0	0.00
6	0.10	0	0.00	0	0.00
5	0.07	1 300 409	93.69	69 441	32.89
4	0.04	66 459	4.79	5 541	2.62
3	0.03	9 221	0.66	0	0.00
2	0.02	2 249	0.16	0	0.00
1	0.00	0	0.00	0	0.00
Total		**1 387 929**		**211 122**	
Canada NOx Fleet Average (grams/mile)		**0.06897630**		**0.160668**	
Fleet Average NOx Standard (grams/mile)		**0.07**		**0.20**	

The average NO_x value for the fleet of LDV/LLDT was 0.06897630 grams/mile, which is 1.5% better than the applicable fleet average NO_x standard of 0.07 grams/mile. In addition, approximately 99% of the LDV/LLDT fleet was certified to a bin having a NO_x standard equal to or better than the applicable fleet average NO_x standard for the 2007 model year (i.e. bin 5 or better).

For the fleet of HLDT/MDPV, the average NO_x value was 0.160668 grams/mile, which is 20% better than the applicable fleet average NO_x standard of 0.20 grams/mile. In addition, approximately 98% of the HLDT/MDPV fleet was certified to a bin having a NO_x standard equal or better than the applicable fleet average NO_x standard for the 2007 model year (i.e. bin 8 or better).

6 Trends in NOx Emission Performance of the Canadian Fleet

6.1 Distribution of Bins

The changing distribution of LDV/LLDT and HLDT/MDPV by NO_x standard (bin) across the 2004 to 2007 model years is depicted in Figures 1 and 2, respectively.

Figure 1: Distribution of LDV/LLDT by NO_x Standard (Bin)

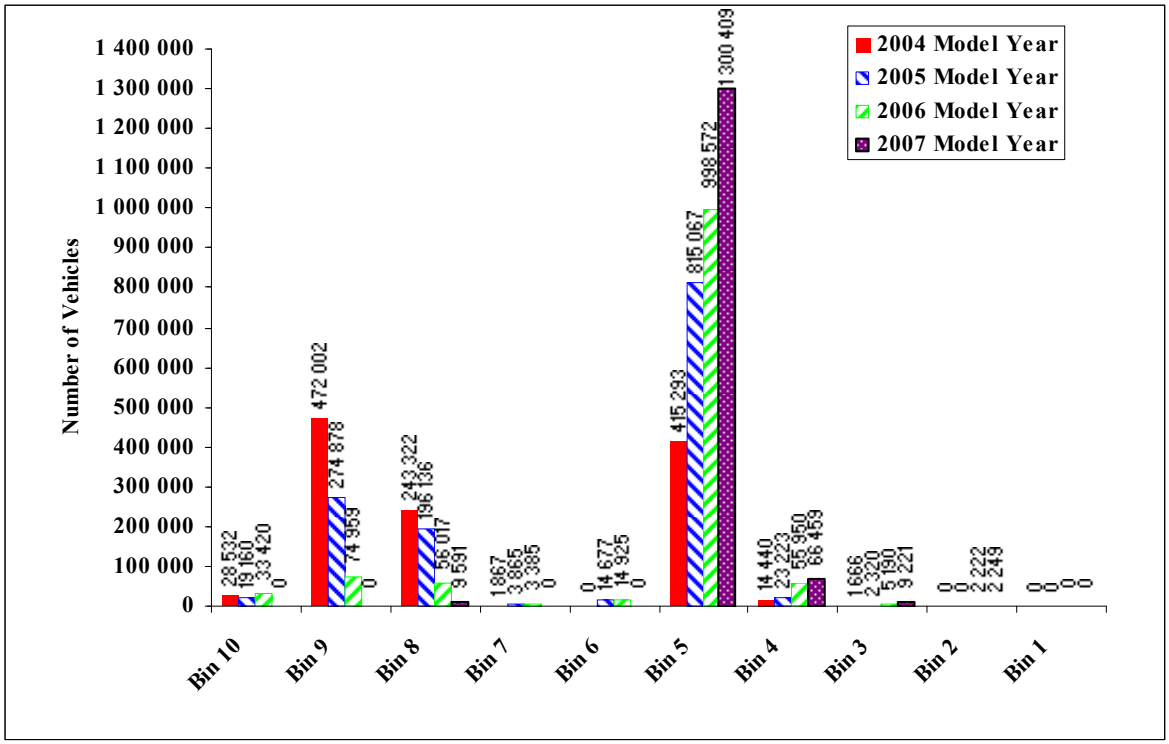
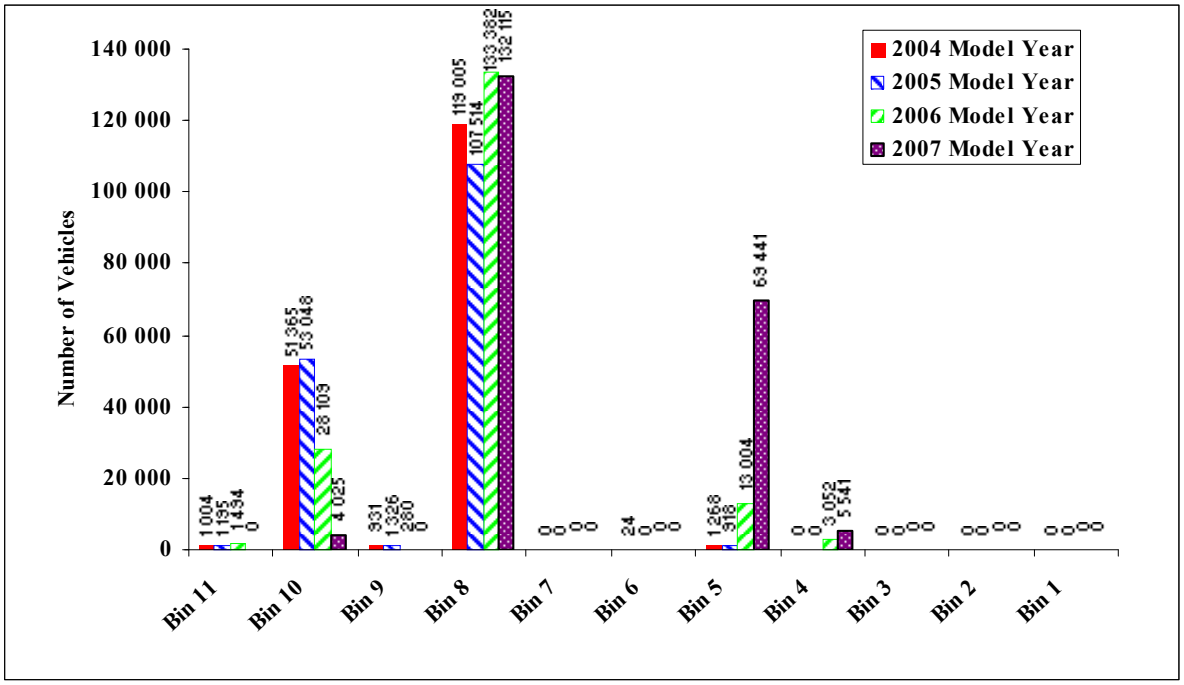


Figure 2: Distribution of HLDT/MDPV by NO_x Standard (Bin)

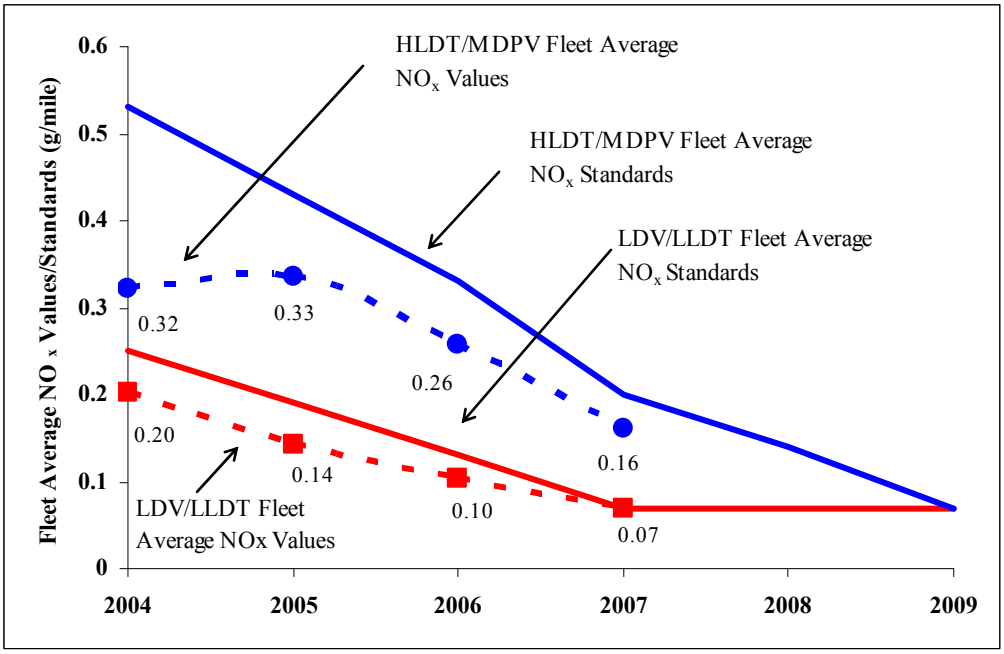


The percentage of LDV/LLDT certified to bin 5—which effectively represents the final phased-in fleet average NO_x standard of 0.07 grams/mile—or better increased from 37% for the 2004 model year to 62% for the 2005 model year, 85% for the 2006 model year and over 99% for the 2007 model year. The distribution of the HLDT/MDPV certified to bin 5 or better increased from less than 1% in the 2004 and 2005 model years to over 35% in the 2007 model year. However it should be recognised that, whereas LDV/LLDT fleets are subject to the 0.07 grams/mile fleet average NO_x standard beginning with the 2007 model year, the phase-in period leading to the final combined fleet average NO_x standard of 0.07 grams/mile extends over the 2004 to 2008 model years for HLDT/MDPV fleets. Beginning in 2009 model year, the combined LDV/LLDT and HLDT/MDPV fleets will be subject to the 0.07 grams/mile fleet average NO_x standard.

6.2 Fleet Average NO_x Values

Figure 3 compares the average NO_x values achieved for the 2007 model year with those of the 2004 to 2006 model years.

Figure 3: Fleet Average NO_x Values and Standards



As shown in the figure above, the average NO_x value for the fleet of LDV/LLDT steadily improved throughout the phase-in period, with an average NO_x value slightly below the phased-in average NO_x standard for the 2007 model year. The average NO_x value for the fleet of HLDT/MDPV continued to decline by approximately the same percentage as the applicable fleet average NO_x standard over the 2005 to 2007 model years, after having risen slightly between the 2004 and 2005 model years. The average NO_x values for both fleets remain below their respective standards.

7 Conclusions

In the fourth year that companies were subject to fleet average NO_x requirements under the Regulations, a total of 22 companies submitted reports for 294 test groups comprising 1 599 051 vehicles of the 2007 model year manufactured or imported for the purpose of sale in Canada. The average NO_x value for the entire Canadian LDV/LLDT fleet is 0.06897630 grams/mile compared to a fleet average NO_x standard of 0.07 grams/mile. The average NO_x value for the entire Canadian HLDT/MDPV fleet is 0.160668 grams/mile compared to a fleet average NO_x standard of 0.20 grams/mile. The NO_x values for both overall fleets remain better than the corresponding fleet average NO_x standards, consistent with the environmental performance objectives of the Regulations.

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