



**Fleet Average NO_x Emission
Performance of 2006 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

June 2008

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 2006 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.

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 NO_x 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 U.S. 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	NO_x	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 9 and 10 are only available for the 2004 to 2006 model years for light-duty vehicles and light light-duty trucks, and up to and including the 2008 model year for heavy light-duty trucks and medium-duty passenger vehicles. 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. 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 fleet⁵ 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).

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

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.

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:**Error!**
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$$\frac{\sum A \times B}{C} \quad [1]$$

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 Canada⁶ 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.

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

3.5 Emission Credits/Deficits

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

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

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 NO_x Emission Performance for the 2006 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 2006 model year in accordance with the requirements of the Regulations, including the vehicle divisions and the number of test groups⁷ 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
DaimlerChrysler Canada Inc.	Chrysler, Dodge, Jeep	31
Ferrari North America, Inc.	Ferrari	2
Ford Motor Company of Canada, Limited	Ford, Lincoln, Mercury	39
General Motors of Canada Limited	Buick, Cadillac, Chevrolet, GMC, Hummer, Pontiac, Saab, Saturn	44
Honda Canada Inc.	Acura, Honda	15
Hyundai Auto Canada	Hyundai	14
Jaguar Canada	Jaguar	6
Kia Canada Inc.	Kia	13
Land Rover Canada	Land Rover	2
Lotus Cars USA, Inc.	Lotus	1
Maserati North America, Inc.	Maserati	1
Mazda Canada Inc.	Mazda	16
Mercedes-Benz Canada Inc.	Mercedes, Smart	10
Mitsubishi Motor Sales of Canada, Inc.	Mitsubishi	11
Nissan Canada Inc.	Infiniti, Nissan	17
Porsche Cars Canada, Ltd.	Porsche	7
Subaru Canada, Inc.	Subaru	7
Suzuki Canada Inc.	Suzuki	4
Toyota Canada Inc.	Lexus, Toyota	23
Volkswagen Canada Inc.	Audi, Bentley, Lamborghini, Volkswagen	28
Volvo Cars of Canada Corporation	Volvo	4
Total		308

A total of 22 companies⁸ submitted reports covering 2006 model year vehicles in 308 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.

⁸ Lotus Cars USA, Inc. submitted a report for the 2006 model year, increasing the total number of companies that submitted reports from 21 to 22.

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 = 0.13 grams/mile
Maximum NO_x = 0.6 grams/mile (Bin 10)

Company	Total Number of Vehicles	Average NO_x Value (grams/mile)
BMW Canada Inc.	25 386	0.13152
DaimlerChrysler Canada Inc.	138 393	0.113105
Ferrari North America, Inc.	119	0.0816
Ford Motor Company of Canada, Limited	121 717	0.0907298
General Motors of Canada Limited	319 032	0.0866673
Honda Canada Inc.	151 722	0.0692996
Hyundai Auto Canada	62 390	0.11126
Jaguar Canada	774	0.0786
Kia Canada Inc.	30 231	0.093899
Lotus Cars USA, Inc.	181	0.0700
Maserati North America, Inc.	94	0.30
Mazda Canada Inc.	61 102	0.084330
Mercedes-Benz Canada Inc.	16 231	0.29763
Mitsubishi Motor Sales of Canada, Inc.	13 203	0.18767
Nissan Canada Inc.	64 811	0.077356
Porsche Cars Canada, Ltd.	1 326	0.2287
Subaru Canada, Inc.	16 571	0.083314
Suzuki Canada Inc.	10 476	0.10133
Toyota Canada Inc.	146 801	0.0794576
Volkswagen Canada Inc.	52 314	0.31752
Volvo Cars of Canada Corporation	11 766	0.070000

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 = 0.33 grams/mile
Maximum NO_x = 0.9 grams/mile (Bin 11)

Company	Total Number of Vehicles	Average NO_x Value (grams/mile)
BMW Canada Inc.	2 461	0.3806
DaimlerChrysler Canada Inc.	33 255	0.33577
Ford Motor Company of Canada, Limited	64 481	0.22970
General Motors of Canada Limited	55 878	0.27135
Honda Canada Inc.	6 300	0.07000
Land Rover Canada	3 221	0.2000
Mercedes-Benz Canada Inc.	4 497	0.2000
Nissan Canada Inc.	3 156	0.2065
Porsche Cars Canada, Ltd.	1 002	0.2403
Toyota Canada Inc.	4 690	0.2000
Volkswagen Canada Inc.	380	0.293

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 0.0692996 grams/mile to 0.31752 grams/mile for the fleet of LDV/LLDT and 0.07000 grams/mile to 0.3806 grams/mile for the fleet of HLDT/MDPV. The calculated average NO_x values for 6 of the 21 companies' LDV/LLDT fleets are above the average NO_x standard of 0.13 grams/mile. The calculated average NO_x values for 2 of the 11 companies' HLDT/MDPV fleets are above the average NO_x standard of 0.33 grams/mile. Average NO_x values above the applicable average NO_x standard for a given fleet are generally attributed to one or more of the following reasons:

1. Fleet contains a very limited number of vehicles. The EPA exempts "small-volume" manufacturers from the requirements of the fleet average NO_x program during the phase-in period. For example, a small-volume manufacturer's fleet of light-duty vehicles and light light-duty trucks is subject to a fleet average NO_x standard of 0.3 grams/mile for 2004–2006, and then subject to a fleet average NO_x standard of 0.07 grams/mile in 2007. In Canada, there is no such provision. However, a company can elect to exclude EPA-certified vehicles that are sold concurrently in both countries from the mandatory fleet average standard in Canada.
2. Fleet includes a substantial number of diesel-fuelled vehicles. It is recognized that achieving low NO_x levels, particularly pending the availability of low-sulphur diesel in 2006 that will enable the use of sophisticated emission control technologies, 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 (CO₂) relative to comparable gasoline-fuelled vehicles.
3. 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., 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., and Maserati North America, Inc. the election effectively applies to their entire fleets of 2006 model year vehicles. As all of their groups of vehicles satisfy the applicable restrictions and none of the companies reported credits, fleet average NO_x values for these companies were reported here for information purposes only, and generate no emission credits/deficits in Section 4.3 of this document.

Mitsubishi Motor Sales of 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. While the same restrictions regarding NO_x emission credits apply to both companies and though fleet average NO_x values are reported in this section for information purposes only, Mitsubishi Motor Sales of Canada, Inc. also reported a fleet average NO_x value for the group of vehicles not subject to the election above the applicable fleet average NO_x standard. Consequently, Mitsubishi Motor Sales of Canada, Inc incurred a NO_x emission deficit for the 2006 model year. The deficit was calculated on the basis of the group of vehicles not subject to the election, as reported in Section 4.3 of this document. Volkswagen Canada Inc.'s fleet average NO_x value for the group of vehicles not subject to the election was below the applicable fleet average NO_x standard and therefore did not incur a deficit.

4.3 Emission Credits/Deficits for the 2006 Model Year

Table 6 summarizes the emission credits/deficits obtained by each company for the 2006 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.

**Table 6: Emission Credits/Deficits for the 2006 Model Year
(vehicle-grams/mile)**

Company	LDV/LLDT	HLDT/MDPV	Total MY 2006 Credits
BMW Canada Inc.	-39	-125	-164
DaimlerChrysler Canada Inc.	2 338	-192	2 146
Ferrari North America, Inc.	0 ¹	0 ²	0
Ford Motor Company of Canada, Limited	4 780	6 467	11 247
General Motors of Canada Limited	13 825	3 277	17 102
Honda Canada Inc.	9 210	1 638	10 848
Hyundai Auto Canada	1 169	0 ²	1 169
Jaguar Canada	40	0 ²	40
Kia Canada Inc.	1 091	0 ²	1 091
Land Rover Canada	0 ²	419	419
Lotus Cars USA, Inc.	0 ¹	0 ²	0
Maserati North America, Inc.	0 ¹	0 ²	0
Mazda Canada Inc.	2 791	0 ²	2 791
Mercedes-Benz Canada Inc.	-2 721	585	-2 136
Mitsubishi Motor Sales of Canada, Inc.	-379 ³	0 ²	-379
Nissan Canada Inc.	3 412	390	3 802
Porsche Cars Canada, Ltd.	-131	90	-41
Subaru Canada, Inc.	774	0 ²	774
Suzuki Canada Inc.	300	0 ²	300
Toyota Canada Inc.	7 420	610	8 030
Volkswagen Canada Inc.	0 ¹	0 ¹	0
Volvo Cars of Canada Corporation	706	0 ²	706
Total	44 586	13 159	57 745

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 company reported a fleet average NO_x value for the group of vehicles not subject to the election above the applicable fleet average NO_x standard. Accordingly, the company incurred a deficit based on the group of 2 228 vehicles not subject to the election and having a fleet average NO_x value of 0.3000 grams/mile.*

A total of 57 745 credits were obtained for the 2006 model year. Four companies incurred an overall deficit with respect to their combined 2006 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 2006 model year.

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

Company	Initial Balance	Total 2006 MY Credits	New Balance	Credits Transferred	End of Model Year Balance
BMW Canada Inc.	965	-164	801	0	801
DaimlerChrysler Canada Inc.	39 078	2 146	41 224	-2 200	39 024
Ferrari North America, Inc.	0	0	0	0	0
Ford Motor Company of Canada, Limited	24 602	11 247	35 849	0	35 849
General Motors of Canada Limited	53 620	17 102	70 722	0	70 722
Honda Canada Inc.	7 901	10 848	18 749	0	18 749
Hyundai Auto Canada	1 534	1 169	2 703	0	2 703
Jaguar Canada	86	40	126	0	126
Kia Canada Inc.	3 435	1 091	4 526	0	4 526
Land Rover Canada	160	419	579	0	579
Lotus Cars USA, Inc.	0	0	0	0	0
Maserati North America, Inc.	0	0	0	0	0
Mazda Canada Inc.	12 087	2 791	14 878	0	14 878
Mercedes-Benz Canada Inc.	49	-2 136	-2 087	2 200	113
Mitsubishi Motor Sales of Canada, Inc.	0	-379	-379	0	-379
Nissan Canada Inc.	14 530	3 802	18 332	0	18 332
Porsche Cars Canada, Ltd.	411	-41	370	0	370
Subaru Canada, Inc.	1 832	774	2 606	0	2 606
Suzuki Canada Inc.	890	300	1 190	0	1 190
Toyota Canada Inc.	14 825	8 030	22 855	0	22 855
Volkswagen Canada Inc.	0	0	0	0	0
Volvo Cars of Canada Corporation	2 832	706	3 538	0	3 538
Total	178 837	57 745	236 582	0	236 582

Notes: A negative sign (-) indicates a deficit.

As shown in the table, in 2006, a limited number of companies used credits earned in previous model years or exchanged credits with another company to offset a deficit in the current model year. One company reported a negative balance at the end of the 2006 model year and is required to offset the deficit no later than the date on which the company submits its 2009 end of model year report.

5 NO_x Emission Performance of the Canadian Fleet for the 2006 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 2006 model year.

Table 8: Distribution of Canadian Fleet

Vehicle Class	Total Number of Vehicles	Percentage of Total Fleet
LDV	821 780	57
LLDT	422 860	30
HLDT/MDPV	179 321	13
Total	1 423 961	100

A total of 1 244 640 LDV/LLDT and 179 321 HLDT/MDPV were reported for the 2006 model year, for a combined total of 1 423 961 vehicles. The overall Canadian fleet for the 2006 model year was comprised of 57% LDV, 30% LLDT and 13% HLDT/MDPV. This distribution is comparable to the 2004 and 2005 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 2006 model year.

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

Bin Number	NO _x 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	-	-	1 494	0.83
10	0.6	33 420	2.69	28 109	15.68
9	0.3	74 959	6.02	280	0.16
8	0.20	56 017	4.50	133 382	74.38
7	0.15	3 385	0.27	0	0.00
6	0.10	14 925	1.20	0	0.00
5	0.07	998 572	80.23	13 004	7.25
4	0.04	55 950	4.50	3 052	1.70
3	0.03	5 190	0.42	0	0.00
2	0.02	2 222	0.18	0	0.00
1	0.00	0	0.00	0	0.00
Total		1 244 640		179 321	
Canada NO_x Fleet Average (grams/mile)		0.1023669		0.256539	
Fleet Average NO_x Standard (grams/mile)		0.13		0.33	

The average NO_x value for the fleet of LDV/LLDT was 0.1023669 grams/mile, which is 21% better than the applicable fleet average NO_x standard of 0.13 grams/mile. In addition, approximately 87% of the LDV/LLDT fleet was certified to a bin having a NO_x standard better than the applicable fleet average NO_x standard for the 2006 model year (i.e. bin 6 or better).

For the fleet of HLDT/MDPV, the average NO_x value was 0.256539 grams/mile, which is 22% better than the applicable fleet average NO_x standard of 0.33 grams/mile. In addition, approximately 83% of the HLDT/MDPV fleet was certified to a bin having a NO_x standard better than the applicable fleet average NO_x standard for the 2006 model year (i.e. bin 9 or better).

6 Trends in NO_x 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 2006 model years is depicted in figures 1 and 2, respectively.

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

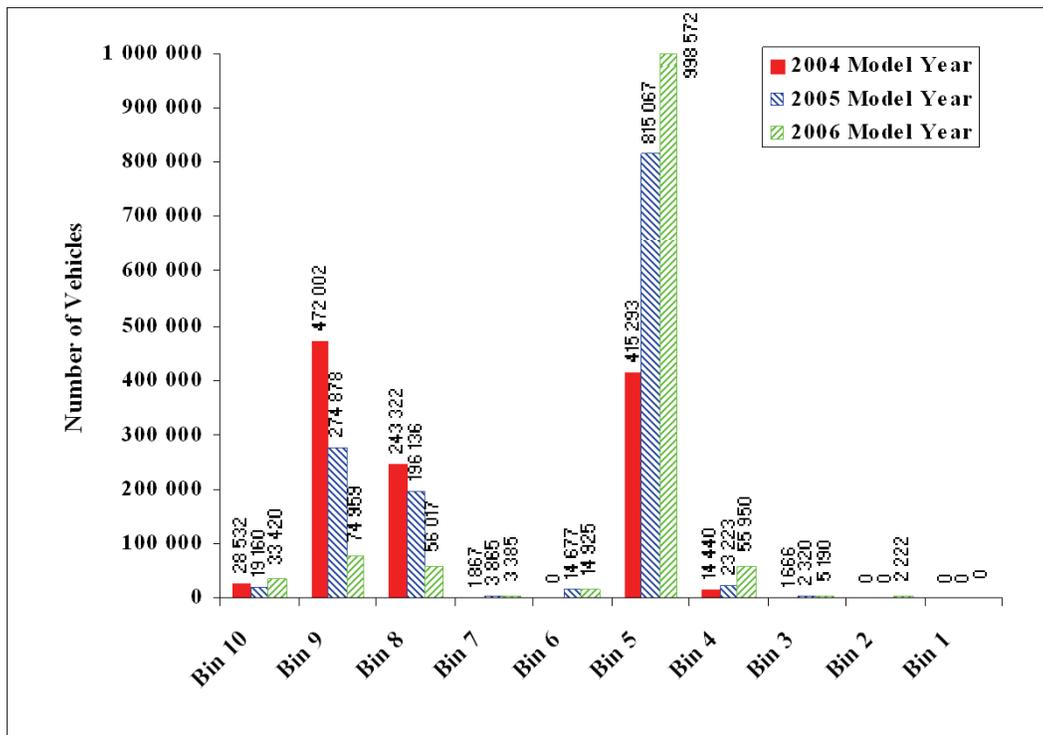
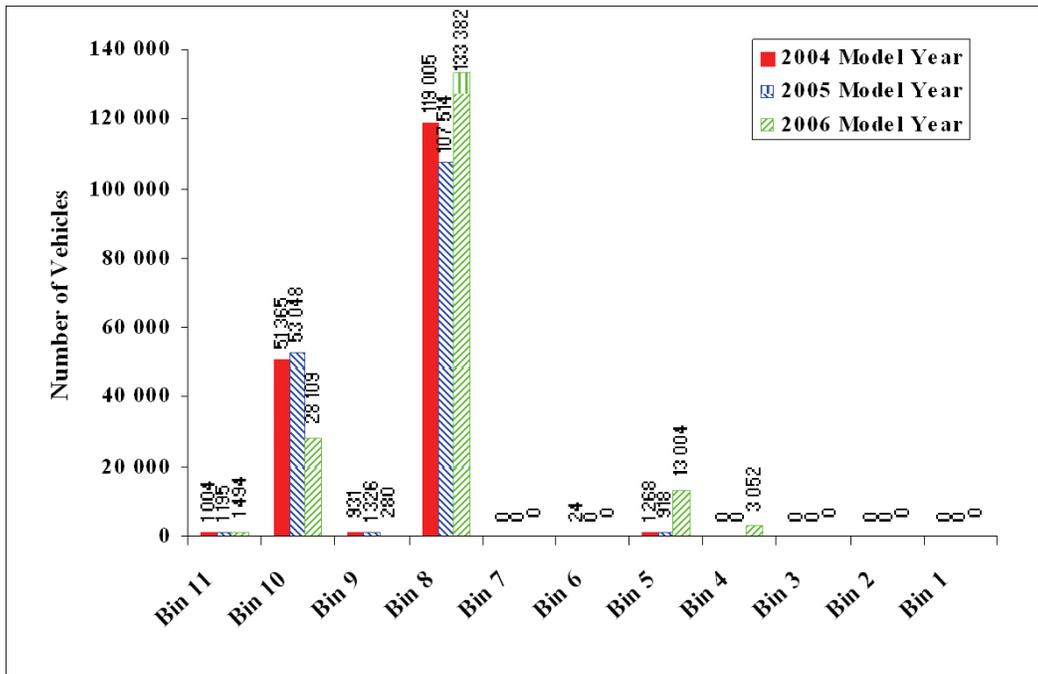


Figure 2: Distribution of HLDT/MDPV by NO_x Standard (Bin)

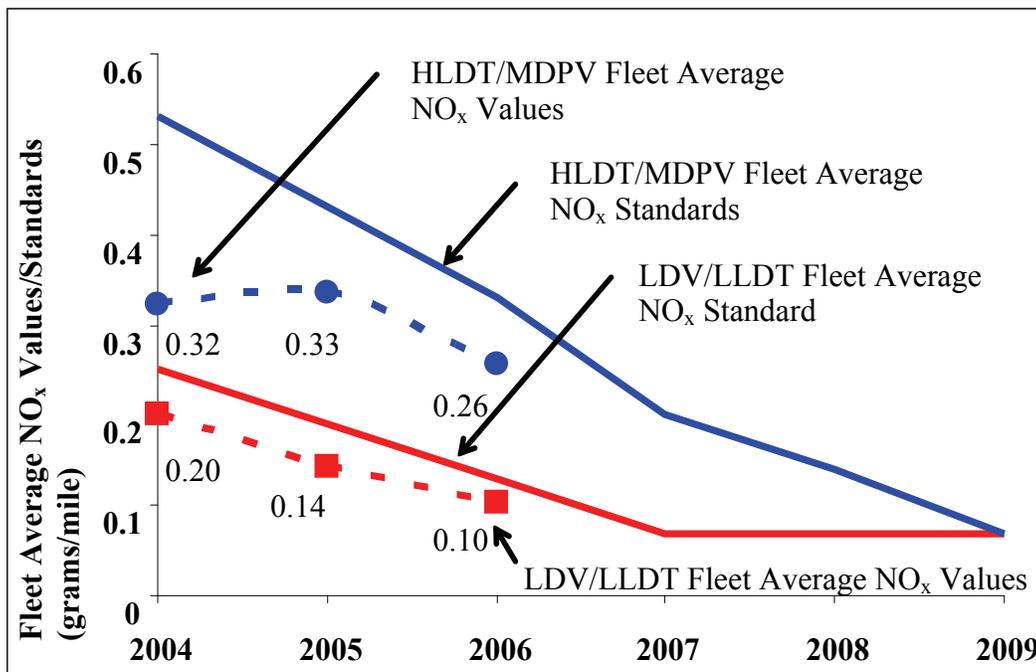


The percentage of LDV/LLDT certified to bin 5—which effectively represents the final phased-in fleet average NO_x standard of 0.07 grams/mile—or better increased from 37% for the 2004 model year to 62% for the 2005 model year and then to over 85% for the 2006 model year. The distribution of the HLDT/MDPV certified to bin 5 or better increased slightly from less than 1% in the 2004-2005 model years to 9% in the 2006 model year. However it should be recognized 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 with the 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 2006 model year with those of the 2004 and 2005 model years.

Figure 3: Fleet Average NO_x Values and Standards



As shown in the figure, the average NO_x value for the fleet of LDV/LLDT continued to decline by approximately the same percentage as the applicable fleet average NO_x standard over the 2004 to 2006 model years. The average NO_x value for the fleet of HLDT/MDPV declined by 23% between the 2005 and 2006 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 by at least 21%.

7 Conclusions

In the third year that companies were subject to fleet average NO_x requirements under the Regulations, a total of 22 companies submitted reports for 308 test groups comprising 1 423 961 vehicles of the 2006 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 0.1023669 grams/mile compared to a fleet average NO_x standard of 0.13 grams/mile. The average NO_x value for the entire Canadian HLDT/MDPV fleet is 0.256539 grams/mile compared to a fleet average NO_x standard of 0.33 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.