



Fleet Average NO_x Emission
Performance of 2005 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

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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 2005 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

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 regulatory burden on companies and enabling the marketing of vehicles in Canada independently from the U.S.

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 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 (HCHO) 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	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%

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 of those vehicles to the first retail purchaser.

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 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:

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

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 2005 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 2005 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	14
Daimler-Chrysler Canada Inc.	Chrysler, Dodge, Jeep	29
Ferrari North America, Inc.	Ferrari	2
Ford Motor Company of Canada, Limited	Ford, Lincoln, Mercury	40
General Motors of Canada Limited	Buick, Cadillac, Chevrolet, Chevy Trucks, GMC, Hummer, Pontiac, Saab, Saturn	43
Honda Canada Inc.	Acura, Honda	16
Hyundai Auto Canada	Hyundai	12
Jaguar Canada	Jaguar	7
Kia Canada Inc.	Kia	9
Land Rover Canada	Land Rover	3
Maserati North America, Inc.	Maserati	1
Mazda Canada Inc.	Mazda	17
Mercedes-Benz Canada Inc.	Mercedes, Smart	13
Mitsubishi Motor Sales of Canada Inc.	Mitsubishi	10
Nissan Canada Inc.	Infiniti, Nissan	17
Porsche Cars Canada Ltd.	Porsche	9
Subaru Canada, Inc.	Subaru	5
Suzuki Canada Inc.	Suzuki	5
Toyota Canada Inc.	Lexus, Toyota	22
Volkswagen Canada Inc.	Audi, Bentley, Lamborghini, Volkswagen	23
Volvo Cars of Canada Ltd.	Volvo	5
Total		302

A total of twenty-one companies submitted reports covering 2005 model year vehicles in 302 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 = 0.19 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.	14 433	0.21565
Daimler-Chrysler Canada Inc.	189 285	0.120658
Ferrari North America, Inc.	120	0.112
Ford Motor Company of Canada, Limited	133 052	0.126425
General Motors of Canada Limited	353 914	0.143400
Honda Canada Inc.	146 028	0.180628
Hyundai Auto Canada	54 193	0.17681
Jaguar Canada	1 387	0.1450
Kia Canada Inc.	30 151	0.087445
Land Rover Canada	280	0.0700
Maserati North America, Inc.	100	0.300
Mazda Canada Inc.	69 414	0.10741
Mercedes-Benz Canada Inc.	12 776	0.27455
Mitsubishi Motor Sales of Canada Inc.	8 237	0.1919
Nissan Canada Inc.	81 486	0.099825
Porsche Cars Canada Ltd.	854	0.196
Subaru Canada, Inc.	18 501	0.10269
Suzuki Canada Inc.	5 864	0.1834
Toyota Canada Inc.	192 711	0.138507
Volkswagen Canada Inc.	24 155	0.38667
Volvo Cars of Canada Ltd.	12 385	0.084931

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.

Table 5: Summary of Company Average NO_x Values for the HLDT/MDPV Fleet
Fleet Average NO_x Standard = 0.43 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.	2 659	0.3926
Daimler-Chrysler Canada Inc.	44 123	0.34976
Ford Motor Company of Canada, Limited	44 212	0.34112
General Motors of Canada Limited	62 471	0.33400
Land Rover Canada	934	0.295
Mercedes-Benz Canada Inc.	1 258	0.2665
Nissan Canada Inc.	1 774	0.2104
Porsche Cars Canada Ltd.	856	0.257
Toyota Canada Inc.	5 012	0.2042
Volkswagen Canada Inc.	702	0.310

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.

The company average NO_x values ranged from 0.0700 grams/mile to 0.38667 grams/mile for the fleet of LDV/LLDT and 0.2042 grams/mile to 0.3926 grams/mile for the fleet of HLDT/MDPV. The calculated average NO_x values for six of the twenty-one companies' LDV/LLDT fleets are above the average NO_x standard of 0.19 grams/mile. All average NO_x values reported for the fleet of HLDT/MDPV are below the average NO_x standard of 0.43 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., 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, which effectively applies to their entire fleets of the 2005 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 in this section for information purposes only, but do not generate emission credits/deficits in Section 4.3 of this document.

4.3 Emission Credits/Deficits for the 2005 Model Year

Table 6 summarizes the emission credits/deficits obtained by each company for the 2005 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 2005 Model Year
(vehicle-grams/mile)**

Company	LDV/LLDT	HLDT/MDPV	Total MY 2005 Credits
BMW Canada Inc.	-370	99	-271
Daimler-Chrysler Canada Inc.	13 125	3 540	16 665
Ferrari North America, Inc.	0 ¹	0 ²	0 ¹
Ford Motor Company of Canada, Limited	8 459	3 930	12 389
General Motors of Canada Limited	16 492	5 997	22 489
Honda Canada Inc.	1 369	0 ²	1 369
Hyundai Auto Canada	715	0 ²	715
Jaguar Canada	62	0 ²	62
Kia Canada Inc.	3 092	0 ²	3 092
Land Rover Canada	34	126	160
Maserati North America, Inc.	0 ¹	0 ²	0 ¹
Mazda Canada Inc.	5 733	0 ²	5 733
Mercedes-Benz Canada Inc.	-1 080	206	-874
Mitsubishi Motor Sales of Canada Inc.	0 ¹	0 ²	0 ¹
Nissan Canada Inc.	7 348	390	7 738
Porsche Cars Canada Ltd.	-5	148	143
Subaru Canada, Inc.	1 615	0 ²	1 615
Suzuki Canada Inc.	39	0 ²	39
Toyota Canada Inc.	9 923	1 132	11 055
Volkswagen Canada Inc.	0 ¹	0 ¹	0 ¹
Volvo Cars of Canada Ltd.	1 301	0 ²	1 301
Total	67 852	15 568	83 420

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.*

A total of 83 420 credits were obtained for the 2005 model year. Two companies incurred an overall deficit with respect to their combined 2005 model year fleets.

4.4 End of Model Year Balance of Emission Credits/Deficits

Table 7 shows all activities relating to credits for the 2005 model year.

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

Company	Initial Balance	Total 2005 MY Credits	New Balance	Credits Transferred	End of Model Year Balance
BMW Canada Inc.	1 236	-271	965	0	965
Daimler-Chrysler Canada Inc.	22 763	16 665	39 428	-350	39 078
Ferrari North America, Inc.	0 ¹	0 ¹	0	0	0
Ford Motor Company of Canada, Limited	12 213	12 389	24 602	0	24 602
General Motors of Canada Limited	31 131	22 489	53 620	0	53 620
Honda Canada Inc.	6 532	1 369	7 901	0	7 901
Hyundai Auto Canada	819	715	1 534	0	1 534
Jaguar Canada	24	62	86	0	86
Kia Canada Inc.	343	3 092	3 435	0	3 435
Land Rover Canada	0 ¹	160	160	0	160
Maserati North America, Inc.	0 ¹	0 ¹	0	0	0
Mazda Canada Inc.	6 354	5 733	12 087	0	12 087
Mercedes-Benz Canada Inc.	573	-874	-301	350	49
Mitsubishi Motor Sales of Canada Inc.	0 ¹	0 ¹	0	0	0
Nissan Canada Inc.	6 792	7 738	14 530	0	14 530
Porsche Cars Canada Ltd.	268	143	411	0	411
Subaru Canada, Inc.	217	1 615	1 832	0	1 832
Suzuki Canada Inc.	851	39	890	0	890
Toyota Canada Inc.	3 770	11 055	14 825	0	14 825
Volkswagen Canada Inc.	0 ¹	0 ¹	0	0	0
Volvo Cars of Canada Ltd.	1 531	1 301	2 832	0	2 832
Total	95 417	83 420	178 837	0	178 837

Notes:

A negative sign (-) indicates a deficit.

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.*

This is the first year that credits earned in a previous model year are available to offset a deficit incurred in a subsequent model year. As shown in the table, in 2005, a limited number of companies used credits earned in the previous model year or exchanged credits with another company to offset a deficit in the current model year. None of the companies reported a negative balance at the end of the 2005 model year.

5 NO_x Emission Performance of the Canadian Fleet for the 2005 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 2005 model year.

Table 8: Distribution of Canadian Fleet

Vehicle Class	Total Number of Vehicles	Percentage of Total Fleet
LDV	880 696	58
LLDT	468 630	31
HLDT/MDPV	164 001	11
Total	1 513 327	100

A total of 1 349 326 LDV/LLDT and 164 001 HLDT/MDPV were reported for the 2005 model year, for a combined total of 1 513 327 vehicles. The overall Canadian fleet for the 2005 model year was comprised of 58% LDV, 31% LLDT and 11% HLDT/MDPV. This distribution is comparable to the 2004 model year.

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.

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	N/A	N/A	1 195	0.73
10	0.6	19 160	1.42	53 048	32.35
9	0.3	274 878	20.37	1 326	0.81
8	0.20	196 136	14.54	107 514	65.56
7	0.15	3 865	0.29	0	0.00
6	0.10	14 677	1.09	0	0.00
5	0.07	815 067	60.41	918	0.56
4	0.04	23 223	1.72	0	0.00
3	0.03	2 320	0.17	0	0.00
2	0.02	0	0.00	0	0.00
1	0.00	0	0.00	0	0.00
Total		1 349 326	100	164 001	100
Canada NO_x Fleet Average (grams/mile)		0.1432473		0.334566	
Fleet Average NO_x Standard (grams/mile)		0.19		0.43	

The average NO_x value for the fleet of LDV/LLDT was 0.1432473 grams/mile, which is 25% better than the applicable fleet average NO_x standard of 0.19 grams/mile. In addition, approximately 78% of the LDV/LLDT fleet was certified to a bin having a NO_x standard similar to or better than the applicable fleet average NO_x standard for the 2005 model year (i.e. bin 8 or better).

For the fleet of HLDT/MDPV, the average NO_x value was 0.334566 grams/mile, which is 22% better than the applicable fleet average NO_x standard of 0.43 grams/mile. In addition, approximately 67% 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 2005 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 2005 model years is depicted in figures 1 and 2, respectively.

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

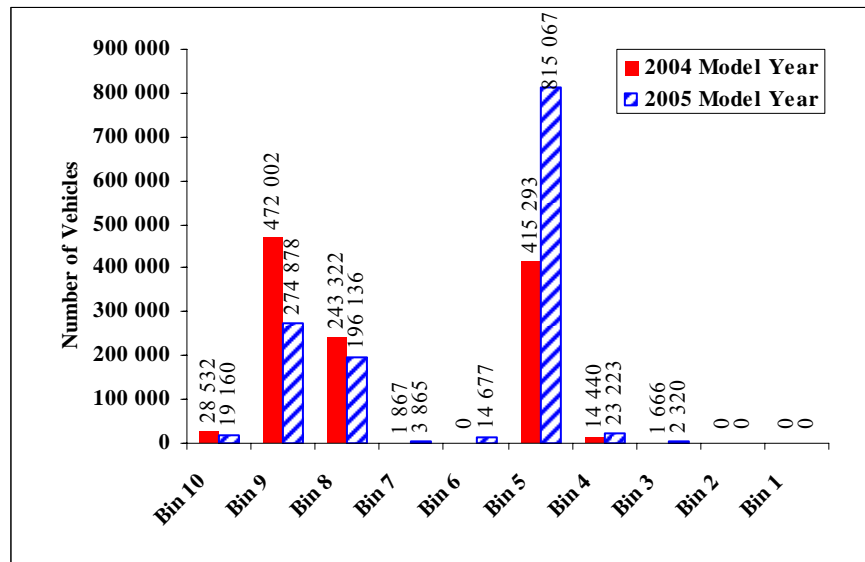
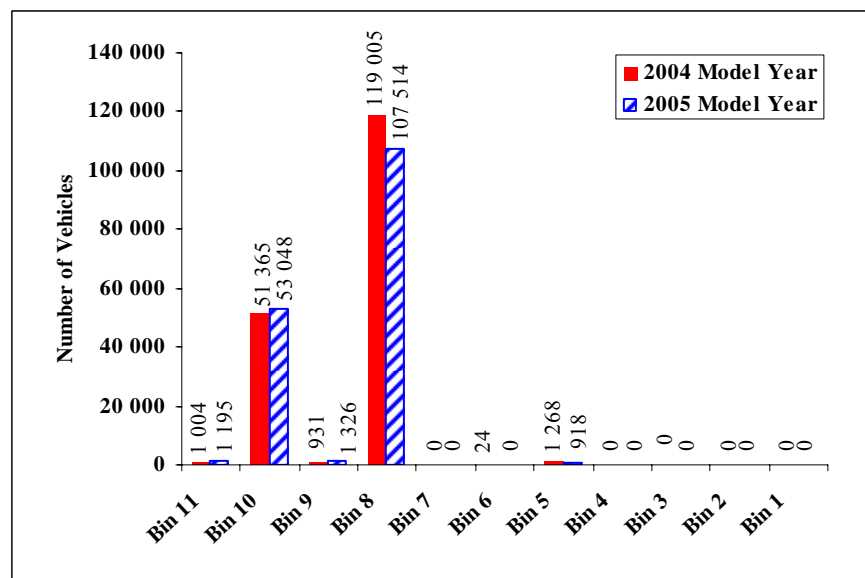


Figure 2: Distribution of HLDT/MDPV by NO_x Standard (Bin)



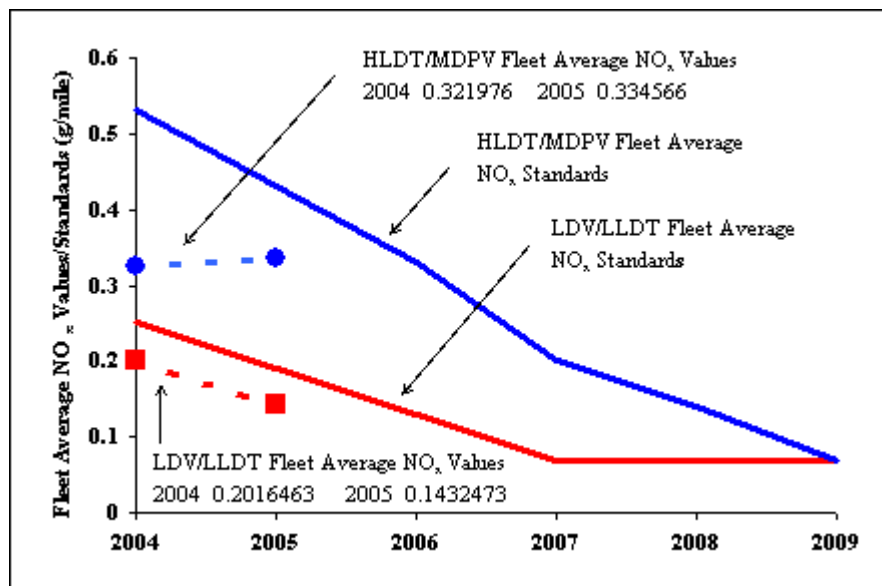
The percentage of LDV/LLDT certified to bin 5—which effectively represents the final phased-in fleet average NO_x standard of 0.07 grams/mile—or better increased from 37% for the 2004

model year to 62% for the 2005 model year, while the distribution of the HLDT/MDPV fleet remained relatively similar. However, HLDT/MDPV fleets are only required to meet the final phased-in fleet average NO_x standard of 0.07 grams/mile in the 2009 model year, compared to the 2007 model year for the fleets of LDV/LLDT.

6.2 Fleet Average NO_x Values

Figure 3 compares the average NO_x values achieved for the 2005 model year with those of the 2004 model year.

Figure 3: Fleet Average NO_x Values and Standards



As shown in the figure, the average NO_x value for the fleet of 2005 model year LDV/LLDT was reduced by about the same percentage as the applicable fleet average NO_x standard, compared to the 2004 model year. However, the average NO_x value for the fleet of HLDV/MDPV remained relatively unchanged. Nonetheless, the average NO_x values for both fleets remain below their respective standards by at least 22%.

7 Conclusions

In the second year that companies were subject to fleet average NO_x requirements under the Regulations, a total of twenty-one companies submitted reports for 302 test groups comprising 1 513 327 vehicles of the 2005 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 0.1432473 grams/mile compared to a fleet average NO_x standard of 0.19 grams/mile. The average NO_x value for the entire Canadian HLDT/MDPV fleet is 0.334566 grams/mile compared to a fleet average NO_x standard of 0.43 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.