Environment and Climate Change Canada
Environnement et Changement climatique Canada

Fleet Average NO_x Emission Performance of 2016 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 and Climate Change Canada

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Canada

Disclaimer

This document provides a summary of data collected pursuant to the *On-Road Vehicle and Engine Emission Regulations* under the *Canadian Environmental Protection Act, 1999*. Information presented in this report is subject to on-going verifications.

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1 Executive Summary

Under the *On-Road Vehicle and Engine Emission Regulations* (hereafter referred to as the "Regulations"), each new light-duty vehicle, light-duty truck and medium-duty passenger vehicle is required to be certified by its manufacturer to one of the bins corresponding to those of the United States Environmental Protection Agency for which there are specific emission standards for oxides of nitrogen (NO_x) and other pollutants. Manufacturers and importers of these vehicles are required to report on their fleet average NO_x emission performance for each model year.

This thirteenth annual performance report summarizes the fleet average NO_x emission performance of the Canadian 2016 model year fleet of vehicles. A total of 22 companies submitted end of model year reports comprising a total of 1,624,808[1] vehicles manufactured in Canada or imported into Canada for the purpose of first retail sale. This report includes the fleet average NO_x value for each company as well as their number of emission credits or deficits. It also provides a comparison of the distribution of vehicles certified to the various emissions bins and compares the overall NO_x performance with that of previous model years.

The average NO_x value for the Canadian 2016 model year combined fleet of light-duty vehicles, light light-duty trucks, heavy light-duty trucks and medium-duty passenger vehicles is 0.05931660[2] grams/mile compared to the standard of 0.07 grams/mile. Each company had a fleet average NO_x value that was at or below the standard and complied with the fleet averaging provisions of the Regulations based on their reports.

The average NO_x value for the Canadian fleet continues to be under the 0.07 grams/mile standard.

[1] The total number of vehicles does not include early-certified Tier 3 vehicles.

[2] The average NOx value does not include early-certified Tier 3 vehicles

2 Purpose

The purpose of this report is to summarize the fleet average NO_x emission performance of individual companies and the overall Canadian fleet for the 2016 model year (MY) based on data submitted by companies in their end of model year reports and any subsequent revisions received prior to the publication of this report. It also serves to report on the effectiveness of the Canadian fleet average NO_x emission program in achieving the environmental performance objectives.

3 Introduction

On January 1, 2004, the *On-Road Vehicle and Engine Emission Regulations* came into effect under the *Canadian Environmental Protection Act, 1999* (CEPA). 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[3] (LDVs), light light-duty trucks[4] (LLDTs), heavy light-duty trucks[5] (HLDTs), medium-duty passenger vehicles[6] (MDPVs), heavy-duty vehicles, heavy-duty engines and on-road motorcycles with those of the U.S. Environmental Protection Agency (EPA) through incorporation by reference to the U.S. Code of Federal Regulations (CFR).

Each new LDV, LLDT, HLDT and MDPV is required to be certified to a bin for which there are specific emission standards for NO_x and other pollutants. 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 current NO_x standard is 0.07 grams/mile, which was introduced in the 2009 model year.

A company's fleet average NO_x value is the weighted average based on the number of vehicles certified to each bin. Though the emission bins, fleet average NO_x standards, and methods of calculating fleet average NO_x values are aligned with those of the U.S. EPA, there are differences 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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[3] Light-duty vehicles are generally passenger cars.

[4] Light light-duty trucks are generally vans, sport utility vehicles and pick-up trucks having GVWR of 2,722 kg (6,000 pounds) or less.

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

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

Amendments to the Regulations in 2015 introduced more stringent "Tier 3" standards beginning with the 2017 model year that include a standard comprised of the sum of non-methane organic gases (NMOG) and nitrogen oxides (NOx) presented as "NMOG + NOx". Under the Tier 3 standards, companies certify a vehicle to a combined "NMOG + NOx" bin. Beginning with the 2015 model year, companies were able to optionally certify vehicles to the new Tier 3 bins. The Tier 3 standard is a change from the Tier 2 standard which utilized a NOx standard. Consequently, performance of Tier 3 certified vehicles, including early certified 2015 and 16 model year vehicles, will be reported beginning with the 2017 model year results once Tier 3 credits and early action credits become available.

The Regulations require that all companies submit a report to the Minister of the Environment and Climate Change no later than May 1 after the end of each model year. The end of model year report must contain detailed information concerning the company's fleet(s) and/or groups of vehicles.

For more information regarding the calculation of fleet average NO_x values and NO_x emission credits or deficits, please refer to the Regulations, which can be found on the Environment and Climate Change Canada CEPA Environmental Registry at http://ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=65.

3.1 Scope of Company Reports

Table 1 presents a list of the companies that submitted an end of model year report for the 2016 model year in accordance with the requirements of the Regulations, including the vehicle makes and a summary of the data received.

The results exclude early-certified Tier 3 vehicles and as a result, they are not accounted for in the calculation of the average NOx value. For the 2016 model year, seven companies reported Tier 3 vehicles. These vehicles represent 8.84% of the total reported fleet.

Table 1: Summary of Company Reports

Company	Makes	Number of Test Groups[7]	Total Number of Vehicles	Average NO_x Value (grams/mile)[8]	Initial Credit Balance[9]	2016 MY Balance[7]
Aston Martin Lagonda Ltd.	Aston Martin	3	91	0.070	0	0
BMW Group Canada	BMW, Mini, Rolls-Royce	22	30,341	0.069958	929	930
FCA Canada Inc.	Chrysler, Dodge, Jeep, Fiat, Alfa Romeo, RAM	23	229,695	0.0428291	74,019	80,260
Ferrari North America, Inc.	Ferrari	2	135	0.0700	0	0
Ford Motor Company of Canada, Ltd.	Ford, Lincoln	45	246,325	0.0542555	56,606	60,484
General Motors of Canada Company	Buick, Cadillac, Chevrolet, GMC	32	198,188	0.0476149	103,401	107,837
Honda Canada Inc.	Acura, Honda	8	128,100	0.0699719	20,736	20,740
Hyundai Auto Canada Corp.	Hyundai	19	128,169	0.0699775	3,418	3,421
Jaguar Land Rover Canada, ULC	Jaguar, Land Rover	7	12,846	0.055932	1,265	1,446
Kia Canada Inc.	Kia	20	74,461	0.068741	4,947	5,041
McLaren Automotive Ltd.	McLaren	1	121	0.070	0	0
Maserati North America, Inc.	Maserati	3	344	0.0700	0	0
Mazda Canada Inc.	Mazda	5	61,706	0.070000	15,090	15,090
Mercedes-Benz Canada Inc.	Mercedes, Smart	19	37,158	0.069636	243	257
Mitsubishi Motor Sales of Canada	Mitsubishi	4	13,814	0.069392	116	124
Nissan Canada Inc.	Infiniti, Nissan	24	109,632	0.0689656	19,065	19,178
Pagani Automobili s.p.a.	Pagani	1	1	0.070	0	0
Porsche Cars Canada, Ltd.	Porsche	11	6,666	See note[10]	See note[10]	See note[10]
Subaru Canada, Inc.	Subaru	9	46,682	0.058961	3,348	3,863
Toyota Canada Inc.	Lexus, Scion, Toyota	37	207,045	0.0664653	29,420	30,152
Volkswagen Group Canada	Audi, Bentley, Bugatti, Lamborghini, Volkswagen	21	87,512	See note[10]	See note[10]	See note[10]
Volvo Cars of Canada Corp.	Volvo	5	5,776	0.06807	3,538	3,549

[7] A test group is the basic classification unit that comprises LDV, LLDT, HLDT or MDPV having similar exhaust emission performances and that share all of the features described in section 1827, subchapter C, part 86 of the CFR.

[8] Fleet average NO_x values are rounded to the same number of significant figures that are contained in the total number of vehicles in a company's fleet.

[9] NO_x emission credits/deficits are rounded to the nearest whole number. A negative sign (-) indicates a deficit.

[10] The average NOx value and credit balance for Porsche Cars Canada, Ltd. and Volkswagen Group are not included in this table due to an ongoing investigation regarding certain of their diesel vehicles. However, no adjustments were made to the total number of vehicles, the number of test groups, the distribution of vehicles by the NOx standard of each bin and the average NOx value for the Canadian fleet (Table 2).

A total of 22 companies submitted a report for the 2016 model year covering a total of 321 distinct test groups. It should be noted that certain test groups were common between companies that shared vehicle platforms or powertrains.

The company average NO_x values ranged from 0.0428291 grams/mile to 0.070000 grams/mile for the fleet of LDVs, LLDTs, HLDTs, and MDPVs, and no companies reported a fleet average NO_x value that was above the standard of 0.07 grams/mile.

A total of 17,358 credits were generated by companies for the 2016 model year. No company incurred a deficit with respect to their fleet, and no company reported a deficit at the end of this model year. In addition, there were no credit transfers to or from companies for the 2016 model year.

3.2 Distribution of Bins and Total Canada NO_x Fleet Average Value

Table 2 summarizes the distribution of vehicles by the NO_x standard of each Tier 2 bin. It also provides the calculated fleet average NO_x value of the entire Canadian fleet for the 2016 model year.

Table 2: Distribution of Vehicles by the NOx Standard of Each Bin

Tier and Bin Number	NOx Standard (grams/mile)	Total Number of Vehicles in "Bin"	Percentage of Vehicles in "Bin"
Tier 2 Bin 8	0.20	606	0.04
Tier 2 Bin 7	0.15	0	0.00
Tier 2 Bin 6	0.10	2,448	0.15
Tier 2 Bin 5	0.07	1,093,979	67.33
Tier 2 Bin 4	0.04	474,842	29.22
Tier 2 Bin 3	0.03	26,808	1.65
Tier 2 Bin 2	0.02	22,925	1.41
Tier 2 Bin 1	0.00	3,200	0.20
Total Number of Vehicles in 2016 MY Fleet			**1,624,808**
Total Canada NOx Fleet Average (grams/mile)			**0.05931660**
Fleet Average NOx Standard (grams/mile)			**0.07**

Notes:

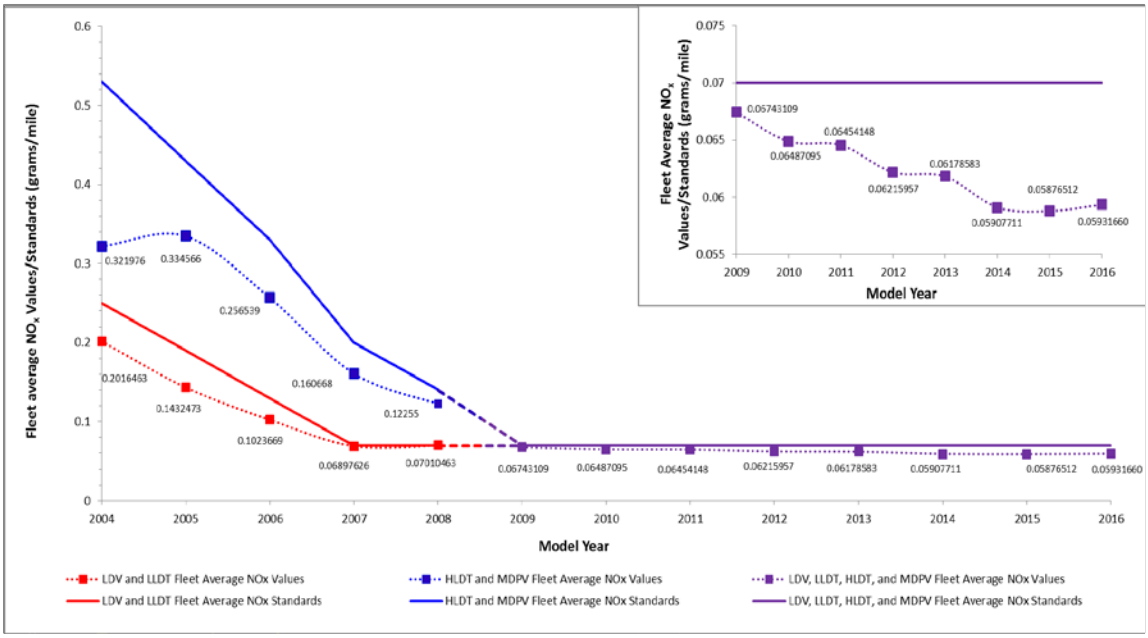
- Beginning in the 2009 model year, applicable standards are limited to bins 1 to 8 for all categories.

For the 2016 model year, almost all vehicles (99.81% of the fleet) were certified to a bin at or below the fleet average NO_x standard of 0.07 grams/mile. The average NO_x value for the Canadian fleet was 0.05931660 grams/mile.

3.3 Fleet Average NO_x Values Trend

Figure 1 presents the average NO_x values trend relative to the applicable standards since 2004 for both the LDV/LLDT and HLDT/MDPV fleets. Beginning in 2009, LDVs, LLDTs, HLDTs, and MDPVs all conform to one NO_x fleet average standard.

Figure 1: Fleet Average NO_x Values and Standards



Overall, the fleet average NO_x value for the combined fleet of LDVs, LLDTs, HLDTs, and MDPVs decreased from 2004 to 2016. More specifically, the fleet average NO_x value for the 2016 model year is 15.26% below the standard of 0.07 grams/mile. It should be noted that Tier 3 certificate vehicles were not included in the NOx fleet average calculations and as a result, there was a slight increase of 0.94% of the average NO_x value for the 2016 model year compared to the 2015 model year value.

4 Conclusions

This is the thirteenth year that companies were subject to the fleet average NO_x requirements under the Regulations. A total of 22 companies submitted reports for a total of 321 distinct test groups comprising 1,624,808 vehicles that were either manufactured in Canada or imported into Canada for the purpose of first retail sale.

The average NO_x value for the Canadian 2016 model year combined fleet of LDVs, LLDTs, HLDTs and MDPVs is 0.05931660 grams/mile compared to the standard of 0.07 grams/mile. Each individual company had a fleet average NO_x value that was at or below the standard, and all companies complied with the fleet averaging provisions of the Regulations based on their reports.

The average NO_x value for the Canadian fleet continues to be under the 0.07 grams/mile standard.

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