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Imperial Oil appreciates the opportunity to submit comments on two documents recently published by Nova Scotia Environment: "Toward a Greener Future - Nova Scotia's Climate Change Action Plan", and "A Discussion Paper - An Approach to Regulating Electricity Sector Greenhouse Gas and Air Pollutant Emissions in Nova Scotia".

Imperial's refinery in Dartmouth began production in 1918 to meet the demands of the First World War, and has continued to grow and upgrade its operations for over 90 years. About 200 people are directly employed at the refinery. It has a processing capacity of up to 89,000 barrels of crude manufacturing 52 different products. Most of these products are sold to customers in the Atlantic Provinces and Eastern Quebec through a network of agents and distributors.

The nature of the refining process requires significant heat, which is obtained by combusting hydrocarbons, a significant portion of which are by-products of the refining process. Alternative energy sources such as from wind or tides are not viable for these applications. Frequent and ongoing world class energy studies have been conducted to identify opportunities to improve our site's energy efficiency. Gains have been made through significant investments and opportunities are continually being sought to further improve energy efficiency. As is typical of an organization constantly investing and focusing on energy efficiency, the next improvement is more difficult to find and increasingly expensive to implement. To compound the energy challenge, new product fuel standards have required increased processing, resulting in increasing energy requirements and GHG emissions.

In June, 2006, the refinery began producing ultra-low sulphur diesel, reducing the sulphur in this fuel by more than 97 per cent. The modifications required to lower this sulphur content took about four years to complete including the largest shutdown in the site's history, which involved over 2,000 contractors. The refinery is currently constructing a new sulphur plant and ancillary equipment which, when completed at the end of 2010, will reduce SO<sub>2</sub> emissions by 25%. A peak labour force of 80 skilled trades people will work on the project during the construction phase, which is estimated to work out to about 170,000 person hours of work.

Climate change presents a risk that could be significant for society and ecosystems. Greenhouse gases are one of the factors, and fossil fuel use is a major source of greenhouse gases. Policy decisions should be based on sound scientific and economic analyses that consider environmental, economic, and social costs and benefits to society. We are pleased that the Climate Change Action Plan takes a comprehensive approach, including actions for energy efficiency, renewable energy, transportation, government leadership, engagement and education, adapting to climate change and tracking progress. The Plan, supported by consultation, provides an opportunity to progress the dual and complementary objectives of Nova Scotia's Competitiveness and Compliance Initiative that is to sharpen the competitive edge of Nova Scotia's economy while providing more rigorous protection of the environment and public health.

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#### Climate Change

The medium-term action (#2), to be implemented after 2013, to reduce GHGs from other energy sources provides needed time to understand the approach to GHG reduction taken by the federal government.

#### Air Quality

Imperial supports the underlying science and a regulatory policy driving reductions in emissions of air pollutants when needed to meet health and environment based standards. We support the application of sound science, risk assessment and cost effective actions that actually lead to air quality improvements.

The Action Plan and Discussion Paper do not detail how the substantial emission reductions at NSPI and a "proportionally equal adjustment for the provincial SO<sub>2</sub> cap" are related to health and environmental standards, such as the Canada Wide Standards (CWS) for particulate matter and ground-level ozone. We are encouraged by the statement that the province will work with industry, the Canadian government and other provinces.

Up-to-date emission inventories and forecasts, reflecting transboundary impacts and marine transport (11% of SO<sub>2</sub> and 15% of NO<sub>x</sub> emissions), and recognizing reduced emissions from new cars and trucks (see "Fuel Formulation and Reduction of On Road Transportation Emissions" at [http://www.believeinit.ca/production\\_auto\\_en.asp?index=1](http://www.believeinit.ca/production_auto_en.asp?index=1); a copy is attached) and regulated reductions in industrial emissions are required for effective policy-making. An understanding of current and projected sources impacting air quality are required to ensure that actions lead to real improvements in air quality for Nova Scotians, while minimizing the cost to society and keeping industry competitive. The petroleum product industry is very competitive. The increases in electricity costs resulting from the proposed actions by NSPI will impact the refinery, as well as other industries and consumers. Dartmouth refinery competes with petroleum products supplied from other provinces and countries. Costs, specific to a particular jurisdiction, cannot always be recovered in such a world wide commodity market.

As is always the case, any further emission reductions deemed necessary for our petroleum refinery in Dartmouth, must be evaluated in the context of its ongoing ability to compete. Imperial continues to support the performance-based objectives with sufficient time for innovation and technology implementation. 2015-2020 policy timeframes are short in view of investment decisions.

Imperial will continue to work with Nova Scotia Environment and other stakeholders on the development of the proposed policies and regulations that impact our operations.

Please contact Ross Matthews at 902 420-7349, if you have questions regarding our response, and regarding consultations related to our operations.

Janet Matsushita  
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cc: R. V. Matthews, Imperial Oil - Dartmouth

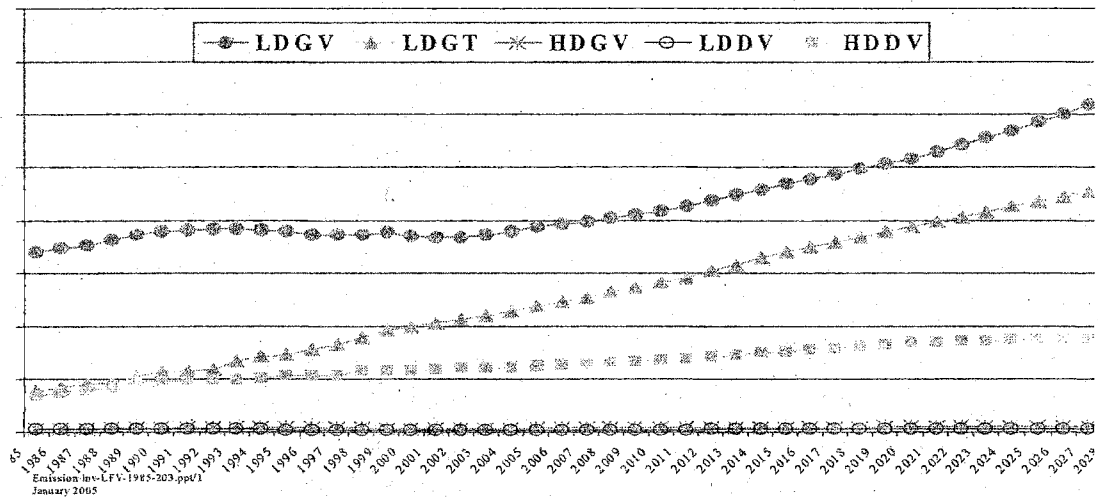
Attachment

# FUEL FORMULATION AND REDUCTION OF ON ROAD TRANSPORTATION EMISSIONS

Reducing vehicle emissions is one of many ways to help improve air quality in our urban centers. CPPI member companies are committed to working with government and industry stakeholders to achieve results by focusing primarily on developing cleaner-burning transportation fuels. Total vehicle emissions have decreased over the last two decades and are expected to continue to decline in the future. These improvements are taking place now, despite the increased number of vehicles on the road and kilometers travelled.

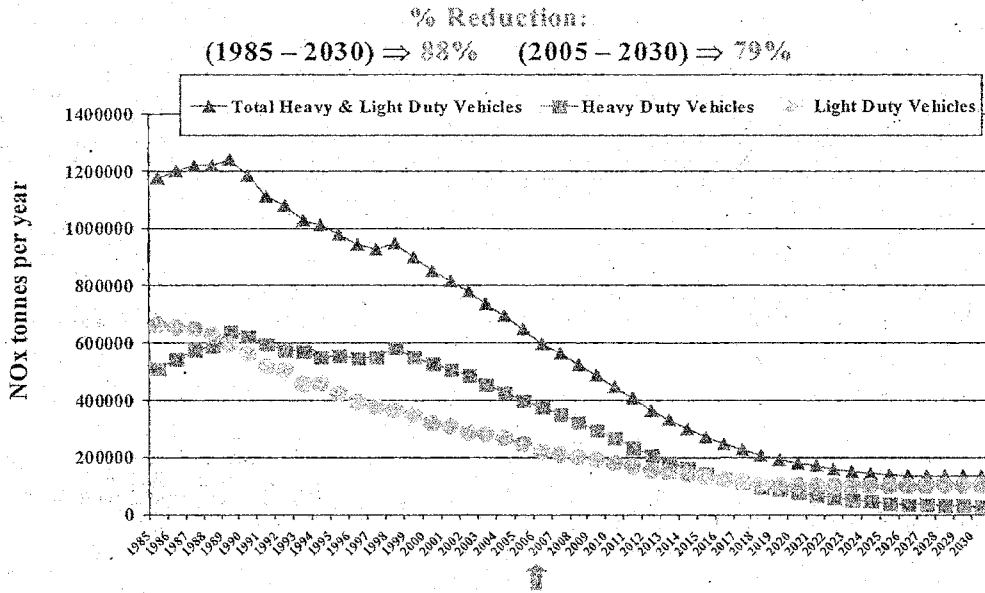
## On-Road Vehicle Emission Inventories for 1985 - 2030 Vehicle Kilometers - Canada

Increases:	(1985-2030)		(2005-2030)	
	LDGV	99%	78%	LDDV
LDGT	509%	104%	HDDV	65%
HDGV	51%	36%		



Advances in vehicle technology, enabled in part by the development of cleaner fuels, also contribute to improved air quality for many years to come. Although urban air quality has continued to improve many Canadians continue to be concerned. CPPI members are taking steps, by introducing cleaner fuels which, coupled with advancements in vehicle emission controls, engine design, address those concerns. As an example, smog causing NOx emissions are expected to decrease nearly 80%, between 2005 and 2030, as shown in the chart below.

## On-Road Vehicle Emission Inventories for 1985 - 2030 NOx Emissions - Canada



### JOINT GOVERNMENT-INDUSTRY ACTIONS

Initiatives to reduce emissions from vehicles, engines and fuels can have significant positive effects on air quality, acid rain, smog and climate change. The Federal and provincial governments are committed to protecting the environment and the health of Canadians by implementing measures to reduce emissions from on road vehicles. CPPI has been supporting the Federal Government agenda on Cleaner Vehicles, Engines and Fuels. ([link to EC NOI](#))

Given that there are approximately 18 million passenger vehicles on Canadian roads, they are a major contributor to air pollution, particularly in urban areas. While emissions of some pollutants from passenger vehicles have declined, air pollution continues to be one of Canada's highest environmental priorities and challenges, so the measures taken will further improve air quality to all Canadians. More information on Automobile industry action is available at:  
([http://www.cvma.ca/eng/special/special\\_10.asp](http://www.cvma.ca/eng/special/special_10.asp))

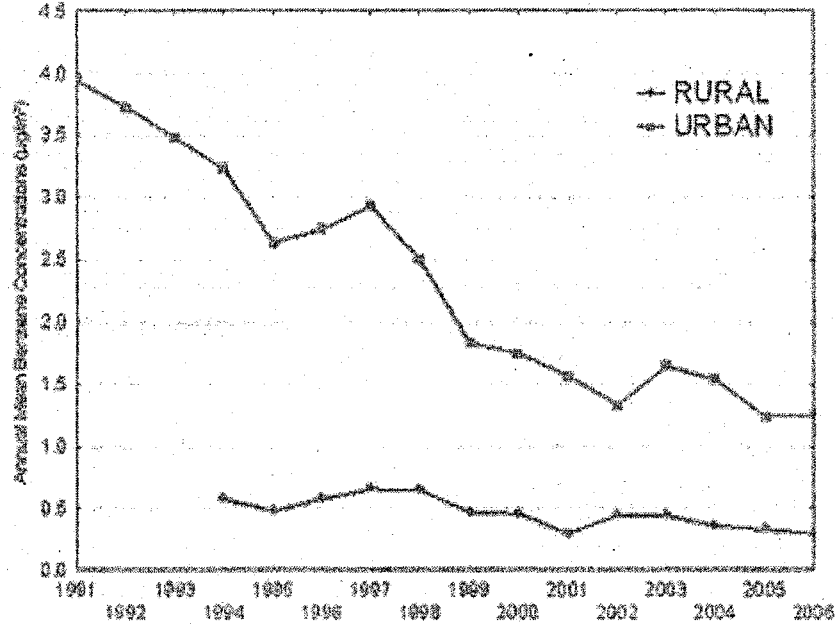
### VEHICLE EMISSION STANDARDS AND FUEL FORMULATIONS

The earliest fuel changes date back to the 1980s when lead phase out was initiated coinciding with the introduction of catalytic converters on passenger vehicles. In 1990 the phase out was complete and leaded gasoline was banned in Canada.

On July 1, 1999, a 'Benzene in Gasoline' regulation was enacted to restrict benzene content in gasoline. The reduction to 1.0 volume percent from 1.7 resulted in 3,000 fewer tonnes of benzene emissions each year.

Largely as a result of improved vehicle emission controls, benzene emissions from gasoline-powered vehicles fell by 60 percent between 1976 and 1991. Continuing efforts to reduce emissions have contributed to a further 33 percent reduction in ambient air concentrations of benzene between the 1991-1995 period. Benzene emissions continue to fall, as can be seen in the attached chart, provided by Environment Canada ([http://www.ec.gc.ca/cleanair-airpur/caol/OGEB/bnz06\\_eng.htm](http://www.ec.gc.ca/cleanair-airpur/caol/OGEB/bnz06_eng.htm)).

Figure 1.3: Average Ambient Benzene Concentration in Canada 1990-2000



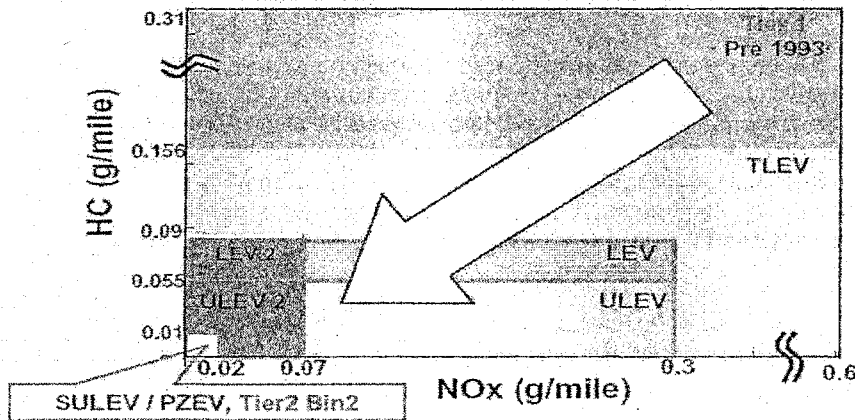
**PASSENGER CARS**

Since 1971, the federal government adopted increasingly stringent standards for smog-forming emissions from motor vehicles. On January 1, 2004, the new On-Road Vehicle and Engine Emission Regulations came into effect under the Canadian Environmental Protection Act, 1999. For passenger vehicles, the regulations phase-in more stringent standards between 2004 and 2009. When these Regulations are fully phased-in, all passenger vehicles will be subject to the same set of emissions standards.

These Regulations reduce the allowable level of nitrogen oxide and volatile organic compound emissions from new vehicles by up to 95 percent and 84 percent, respectively, relative to previous requirements.

**North American Vehicle Emission Standards**

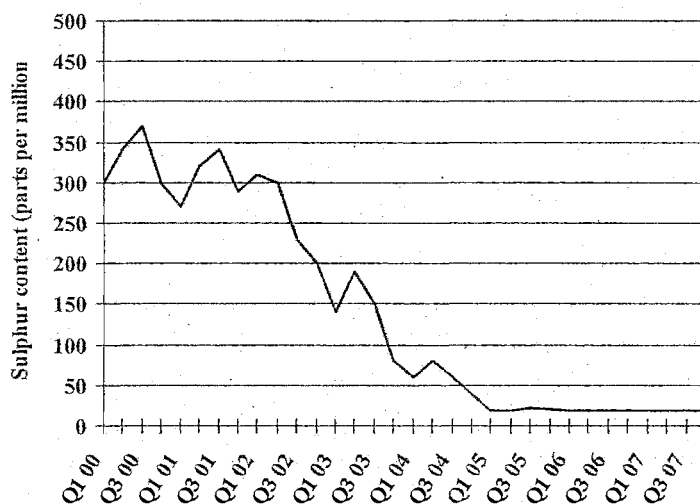
California and Federal Standards



For the new Tier 2 standards, emission system performance must be maintained for 120,000 miles (192,000 km)

The vast majority of passenger vehicles operate using gasoline. Low levels of sulphur in gasoline enable the effective operation of vehicle emission control technologies. As a result of the requirements of the Sulphur in Gasoline Regulations, sulphur levels in Canadian gasoline were reduced to an average of 30 parts per million (ppm) as of January 1, 2005. This level represents a reduction of more than 90% relative to average sulphur levels of 2000. The figure below illustrates the progress that CPPI members have made to the reduction in sulphur in gasoline. CPPI member refiners have reduced the sulphur content of their gasoline by approximately 90% to an annual average of less than 30 ppm.

### CPPI Reduction in Sulphur in Gasoline (2000 – 2007)



Source: CPPI member companies

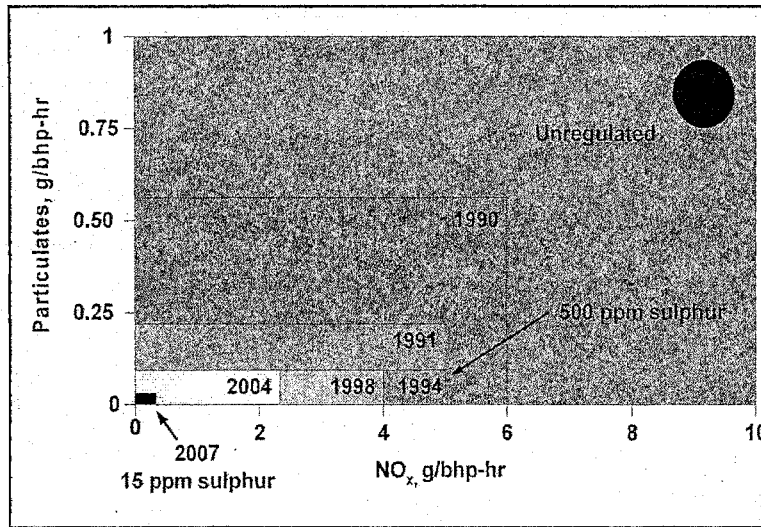
### TRUCKS AND BUSES

Trucks and buses are types of heavy-duty vehicles used in Canada and are powered by diesel engines.

These vehicles play an integral role in driving the Canadian economy and it is important to ensure that their environmental impact continues to be addressed. On January 1, 2004, the new *On Road Vehicle and Engine Emission Regulations* came into effect under the Canadian Environmental Protection Act, 1999. For heavy-duty diesel vehicles, the regulations phase-in more stringent standards for smog forming emissions between 2004 and 2010.

**These regulations reduce nitrogen oxides and particulate matter emissions from new vehicles by 95 per cent and 90 per cent respectively, relative to previous requirements.**

# Heavy duty vehicle emissions standards



➔ 2007 MY vehicles will achieve an ultra low emission level

Low levels of sulphur in diesel fuels are necessary to ensure the effective operation of advanced emission control technologies. The *Sulphur in Diesel Fuel Regulations* require that the sulphur level in Canadian on-road diesel fuel be reduced to a maximum of 15 parts per million (ppm) in June 2006.

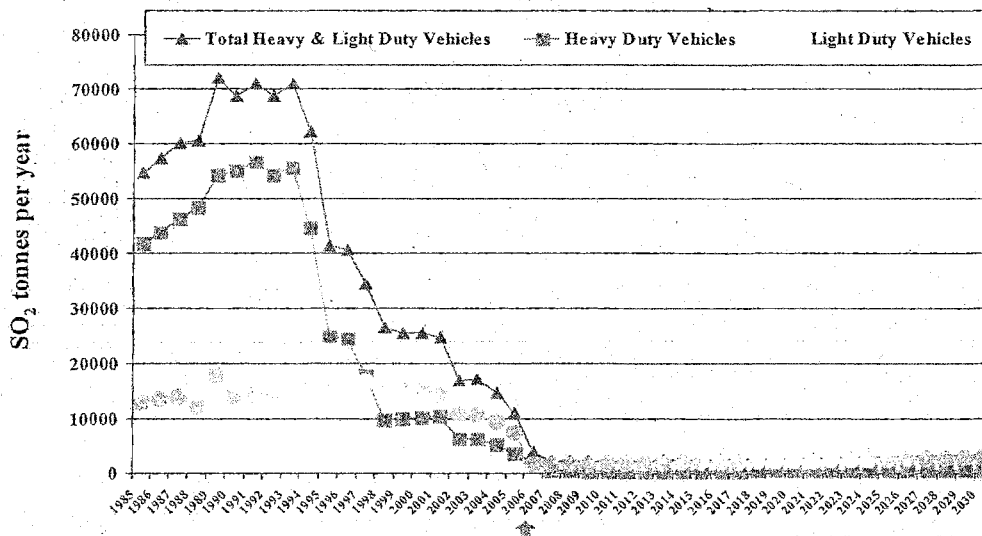
The following chart illustrates the reduction of SO<sub>2</sub> emissions from both gasoline and diesel vehicles. This is a direct result of the petroleum industry investments of \$5.2 B in Canada to reduce of sulphur in fuels and the benefits are seen across the fleet as soon as the fuel change has been implemented, as shown in the following charts.

## On-Road Vehicle Emission Inventories for 1985 - 2030

### SO<sub>2</sub> - Canada

% Reduction:

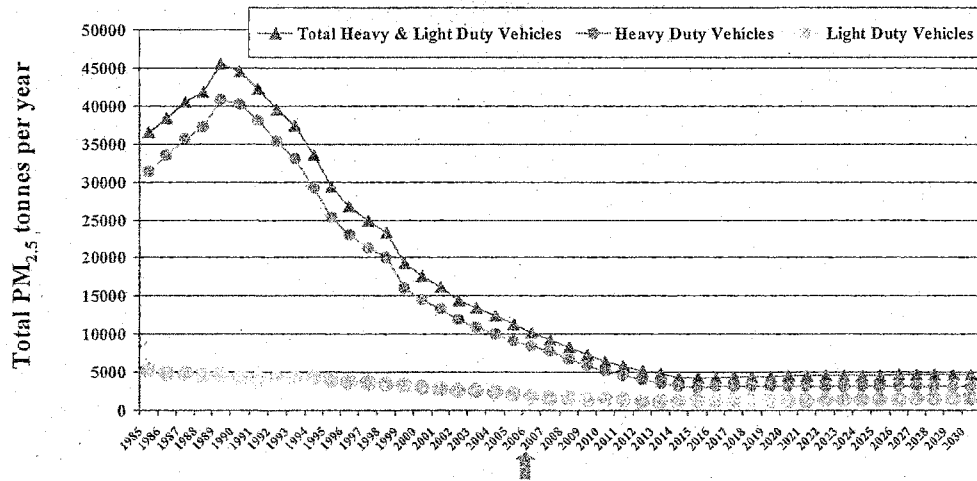
(1985 - 2030) ⇒ 94%    (2005 - 2030) ⇒ 69%



The reduction of PM emissions are a result of a combination of the fuel changes and the vehicle emission control technology changes. As can be seen below, the Particulate matter (PM) reduction in diesel is significant and will continue to improve as more efficient trucks and buses replace the old ones, over the next decade.

### On-Road Vehicle Emission Inventories for 1985 - 2030 TOTAL PM<sub>2.5</sub>\* - Canada

% Reduction:  
(1985 - 2030) ⇒ 87%    (2005 - 2030) ⇒ 57%



\* (Includes direct sulphate and non-sulphate PM exhaust emissions)

Emission Inv-LFV-1985-203.ppt/3  
January 2005

GPPI member companies are dedicated to meeting the transportation of energy need for Canadian and will continue to supply quality fuel products meeting the consumer and societal needs.