

Proposed Regulations to Limit Greenhouse Gas Emissions from New On-Road Heavy-Duty Vehicles



Government/ Industry Meeting
Task Force on Vehicle Weights and Dimensions Policy
November 30, 2011

Outline

- Context and Key Policy Objectives
- Key Elements of Proposed Regulations
- Next Steps



Context and Key Policy Objectives

Proposed Regulations to Reduce Greenhouse Gas Emissions from New On-Road Heavy-duty Vehicles



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Page 3

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Context

- The Government of Canada is committed to reducing Canada's total greenhouse gas emissions (GHGs) by 17% from 2005 levels by 2020
- Transportation is one of the largest sources of GHG emissions in Canada, accounting for about 22% of total GHGs in 2005
 - Heavy-duty trucks are 6% of total GHGs
- Taking action to reduce GHGs from heavy-duty vehicles is an important element of the Government's plan to introduce an integrated, nationally consistent approach to reduce emissions of air pollutants and GHGs to protect the health and environment of Canadians
- The Government of Canada is committed to work closely with the U.S. towards the implementation of common national standards
 - highly integrated nature of the North American heavy-duty vehicle industry



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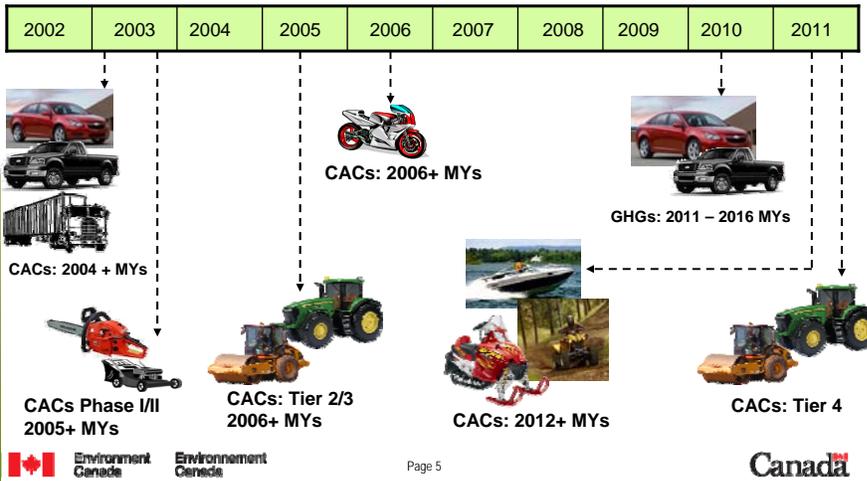
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Page 4

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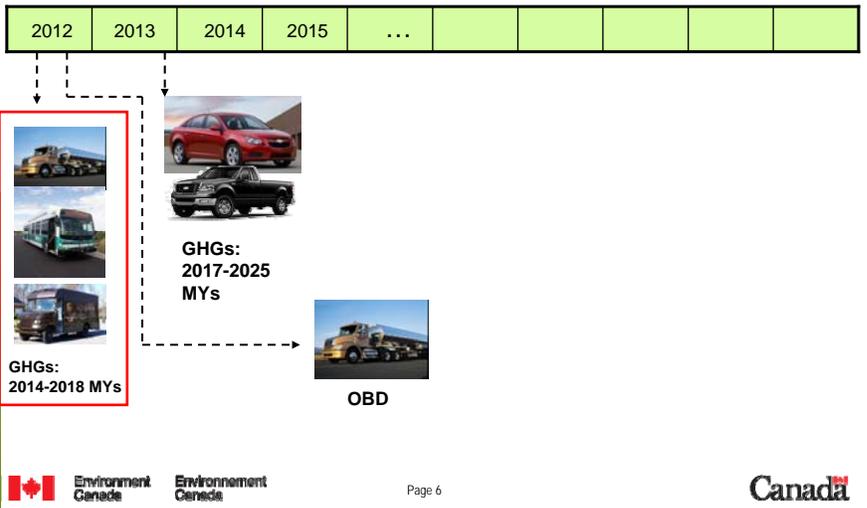
Canada's Regulatory History

Environment Canada has developed numerous regulations in alignment with the U.S. federal standards



Canada/U.S. Alignment Continues

Environment Canada has several regulations under development



Development of GHG Emission Regulations for New On-Road Heavy-Duty Vehicles

- **May 2010:** the Government of Canada jointly announced with the U.S its intent to develop emission standards aligned with U.S. national standards
- **October 2010:** Canada released a regulatory framework outlining the general direction for consideration in the Canadian regulations
 - Comments received were helpful in moving forward with the proposed regulatory approach
- **August 9, 2011:** Canada released a detailed consultation document describing the **key elements** of the future Canadian regulations



Key Objectives of the Proposed Regulations

- To reduce GHG emissions from on-road heavy-duty vehicles and their engines of the 2014 and later model years
- To establish emission standards and test procedures that are aligned with U.S. national standards
 - prescribing common definitions to ensure that the application of regulatory requirements are consistent
 - providing companies with equivalent compliance flexibilities
- To provide regulatory certainty and set an enforceable level playing field for the sector



These objectives recognize the integrated nature of the heavy-duty vehicle industry and aim to minimize regulatory compliance burden





Key Elements



*Proposed Regulations to Reduce
Greenhouse Gas Emissions from New
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Page 9

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Regulated Entities



- **Regulated entities**

- The following would fall under the authorities of CEPA 1999 and would therefore be subject to the proposed regulations
 - A company engaged in the business of manufacturing vehicles, engines or equipment in Canada; or
 - A company importing any vehicle, engine or equipment into Canada for the purpose of sale
- Companies that own or operate vehicles would not be subject to the proposed regulations
 - Companies that import vehicles would be required to submit declaration at custom that vehicle complies with U.S. standards



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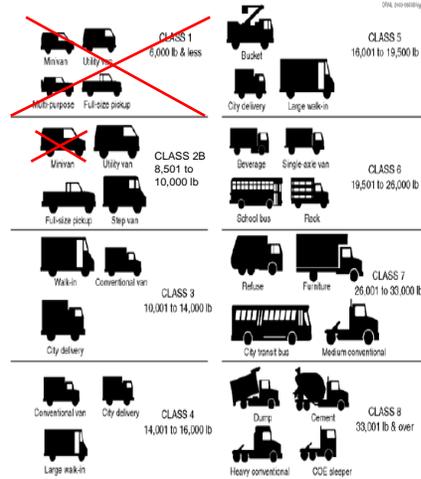
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Page 10

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Regulated Vehicles

- Same applicable vehicle categories/classes as those of the U.S. Environmental Protection Agency (EPA)
- Proposed regulations would reduce emissions from the whole range of new on-road heavy-duty vehicles (i.e., Class 2B to 8)
- Trailers attached to combination tractors not initially subject to proposed regulations



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Page 11



Emission Standards

- Canada's regulations under CEPA 1999 would only prescribe GHG standards, not fuel consumption as per the U.S. joint rulemaking
- Regulations would set standards for same pollutants as U.S. Environmental Protection Agency regulations
- Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and hydrofluorocarbon (HFC) refrigerants



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Page 12



CO₂ Emission Standards

- Objective is to reduce CO₂ emissions not only from the engine, but also from the complete vehicle
- Regulations would recognize broad range of vehicle applications; emissions standards expressed as CO₂ emissions per unit of work
- CO₂ standards to become progressively stringent between 2014 and 2018 model years



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Page 13

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CO₂ Emission Standards (cont'd)

1. Class 2B and 3 heavy-duty pick-up trucks and vans

- Fleet average standard (grams of CO₂/ mile) similar to scheme for light-duty vehicles based on vehicle “footprint”
- Instead of “footprint”, standards would vary based on the vehicles’ “work factor”



2. Combination tractors

- Separate standards for engine (grams of CO₂/BHP-hr) and vehicle (grams of CO₂/ ton*mile)



3. Vocational vehicles

- Freight, delivery, service, cement, garbage and dump trucks, as well as buses
- Same approach as for combination tractors



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Page 14

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CO₂ Standards – Class 2B and 3: Pick-ups and Vans



- Emission standard would be based on a fleet average and measured in grams of CO₂ per mile (g/mile)
- CO₂ average standard would vary based on the vehicles' "work factor":
 - Work factor based mainly on vehicle payload and towing capacity
 - Vehicles with larger payloads and towing capacities would be permitted to emit more GHGs
- Vehicles equipped with spark-ignition and compression-ignition engines have separate targets



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Page 15

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CO₂ Standards – Combination Tractors

- This category would include heavy-duty trucks that are designed to haul a trailer, and would be further subdivided as follow:

	Day Cab		Sleeper Cab
	Class 7	Class 8	Class 8
Low Roof			
Mid Roof	--	--	
High Roof			



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Page 16

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CO₂ Standards – Combination Tractors

CO₂ Tractor **Vehicle** Emissions Standards (g/ton-mile):

Tractor Class	Characteristics	CO ₂ emission standard for the 2014 to 2016 model years	CO ₂ emission standard for the 2017 and after
Class 7	Low-roof (all cab styles)	107	104
	Mid-roof (all cab styles)	119	115
	High-roof (all cab styles)	124	120
Class 8	Low-roof day cab	81	80
	Low-roof sleeper cab	68	66
	Mid-roof day cab	88	86
	Mid-roof sleeper cab	76	73
	High roof day cab	92	89
	High roof sleeper cab	75	72



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Page 17

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CO₂ Standards – Vocational Vehicles

- Includes all remaining trucks and buses of all sizes and functions not covered in previous two groups
- Vehicle emission standards would be measured in grams of CO₂ per ton-mile (g/ton-mile)
- Emission standards categorised by vehicle class weight



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Page 18

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CO₂ Standards – Vocational Vehicles

CO₂ Vocational **Vehicle** Emissions Standards (g/ton-mile):

Vocational Vehicle Class	CO ₂ emission standard for model years 2014 to 2016	CO ₂ emission standard for 2017 and after
Classes 2B, 3, 4 and 5	388	373
Classes 6 and 7	234	225
Class 8	226	222



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Page 19



CO₂ Standards – Engines

- Would apply to engine designed for use in tractors and vocational vehicles
- Engine emission standards would be measured in grams of CO₂ per brake horsepower-hour (g/BHP-hr)
 - Engine standards would vary based on engine size
- The CO₂ standards become more stringent in 2017 model year



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Page 20



CO₂ Engine Standards

- CO₂ Tractor **Engine** Emissions Standards (g/BHP-hr):

Model year	Medium heavy-duty engines	Heavy heavy-duty engines
2014 to 2016	502	475
2017 and after	487	460

- CO₂ Vocational **Engine** Emissions Standards (g/BHP-hr):

Compression-ignition engine (diesel)				Model year	Spark-ignition engine (gasoline)
Model year	Light heavy-duty engines	Medium heavy-duty engines	Heavy heavy-duty engines		
2014 to 2016	600	600	567	2016 and after	627
2017 and after	576	576	555		



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Page 21

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Other GHG Emission Standards

- The regulations would also prescribe other transportation-related GHG emissions standards including HFCs (refrigerants), CH₄ and N₂O
- Refrigerant leakage standard of 1.5% per year
 - Applies to heavy-duty pick-up trucks and vans, and combination tractors
- CH₄ and N₂O emission standards for engines and pick-up trucks and vans designed to prevent emission increases
 - Pick-up trucks and vans: 0.05 g/mile
 - Engines: 0.10 g/BHP-hr
 - Normalized by their relative global warming potential



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Page 22

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Compliance Assessment

- Companies would be required to demonstrate compliance with emissions standards using prescribed emissions testing procedures or simulation modelling procedures, aligned with the U.S.:
 - Class 2B and 3 Pick up trucks and vans: prescribed test cycles on a chassis dynamometer (complete vehicle testing).
 - Tractors and vocational vehicles: computer simulation model (GEM) (see next slide)
 - Engines: prescribed test cycles on an engine dynamometer (engine only testing)
- EPA Certificates accepted to demonstrate compliance with the emissions standards



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Page 23



GEM Model

- As opposed to chassis or engine dynamometer tests, GEM model offers inexpensive method of demonstrating compliance
- GEM uses standardized engine, transmission, payload
- For tractor, assess aero drag, rolling resistance, APU, speed limiter and weight reduction
- Model only accounts for tire rolling resistance for vocational vehicle results



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Page 24



Canada-Unique Vehicles

- For vehicles and engines not covered by a U.S. EPA certificate, companies would have to provide evidence that they conform with the standards
 - Evidence would be submitted prior to importation or the application of the national emissions mark
 - Evidence would be provided in a form and manner satisfactory to the Minister and consist of the same kind of information provided to EPA for certification
- Environment Canada would acknowledge information before the vehicles or engines are imported



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Page 25

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Compliance Flexibilities



- Emission averaging, banking or trading of emission credits
 - Credits and deficits monitored through annual reporting
 - Credits valid for 5 years; deficits must be offset within 3 years
- Incentives for advanced technology vehicles (electric, fuel cell, hybrid vehicles) and innovative technologies
- Optional early credits for all 2013 model year vehicles and electric vehicles of 2011-2013 model years
- Credit multipliers for advanced technology vehicles and early credits
- Alternative phase-in requirements for pick-up trucks and vans and for engines
- Exemptions for certain classes and applications
 - Vocational tractors and off-road vehicles



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Page 26

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Costs and Benefits

- A detailed costs-benefit analysis of the proposed regulations will be undertaken as part of the regulatory impact analysis
- U.S. estimates that regulations would result in an increase of up to approximately \$6,000 for the average cost of a 2018 model-year combination tractor
- Preliminary estimates show a potential 2Mt, or 4%-6%, reduction of CO₂ emissions by 2020 compared to a business as usual scenario



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Page 27

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Next Steps



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Greenhouse Gas Emissions from New
Heavy-duty Vehicles*



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Page 28

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Next Steps

- Publish proposed regulations in the *Canada Gazette*, Part I is targeted for early **2012**, followed by a formal 60-day consultation period
- Comments received will be taken into consideration in the development of final regulations, planned to be published in the *Canada Gazette*, Part II **later in 2012**
 - Effective for the 2014 and later model years
 - Implementation date aligned with the U.S.

Continue close collaboration with the U.S. EPA to ensure a common North American regulatory approach



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Page 29

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