Pembina Institute Comments to Transport Canada on the Development of Motor Vehicle Fuel Consumption Regulations

Prepared by Clare Demerse[1]
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On January 17, 2008, the Minister of Transport, Infrastructure and Communities announced consultations on the development of national fuel consumption regulations for new cars and light trucks in Canada, beginning with the 2011 model year.[2] The Government of Canada had previously confirmed its commitment to mandatory fuel efficiency standards in April 2007 with the release of its *Regulatory Framework for Air Emissions*, which stated that the fuel efficiency standards will be "designed for Canada to maximize our environmental and economic benefits and will be benchmarked against a stringent, dominant North American standard."[3]

The Pembina Institute welcomes this opportunity to provide input into the consultation process. While we believe that mandatory standards for vehicle fuel efficiency are essential, the targets and policy design details are crucial to assuring that the standards do indeed "maximize" the environmental and economic benefits for Canadians. The comments below focus on sections (1, fourth bullet), (3, general, third and fourth bullets), and (5) of the stakeholder comment questions,[4] and also include general comments.

1 (fourth bullet). "New Features of the U.S. Energy Act expanding manufacturers' flexibility in meeting annual standards and their desirability or feasibility in a Canadian context, including... [the] extension from 2014 to 2019 of credits allowed for flexible-fuel vehicles"

According to the *Regulatory Framework for Air Emissions*, the government's regulatory effort, which includes vehicle fuel efficiency standards, is "the cornerstone of the government's broader efforts to address the challenges of climate change and air pollution."[5]

In contrast, the goal of the *U.S. Energy Independence and Security Act* is: "To move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and

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[1] The Pembina Institute, phone: 819-483-6288, ext. 24; email: clared@pembina.org.
[2] Transport Canada, "Canada's First Motor Vehicle Fuel Consumption Regulations: Consultations Begin," news release, January 17, 2008. Also available online at http://www.tc.gc.ca/mediaroom/releases/nat/2008/08-h006e.htm.
[3] Environment Canada, *Regulatory Framework for Air Emissions* (Ottawa, ON: Government of Canada, 2007), 29. Also available online at http://www.ecoaction.gc.ca/news-nouvelles/pdf/20070426-1-eng.pdf.
[4] Transport Canada, *A Better Canada — A Cleaner Environment: The Development of Motor Vehicle Fuel Consumption Regulations* (Ottawa, ON: Government of Canada, 2008), 6. Also available online at http://www.tc.gc.ca/pol/en/environment/FuelConsumption/pdf/FuelConsumptionReg.pdf.
[5] Environment Canada, *Regulatory Framework for Air Emissions*, iii.

vehicles..."[6] In support of the goal of U.S. "energy independence," the *Act* allows an extremely generous treatment of flexible-fuel vehicles (vehicles capable of running on E85 ethanol) for the purposes of compliance with its vehicle efficiency standards.

This treatment has no place in Canadian fuel efficiency standards whose explicit goal is the reduction of air emissions. Canada has virtually no E85 stations, which means that the effective greenhouse gas (GHG) benefit of purchasing a flex-fuel vehicle in the place of a comparable non-flex fuel vehicle is likely to be zero. Even if Canada does increase its E85 fuel infrastructure in the future, providing a generous credit for E85 capability in vehicles would reduce the incentive for automakers to invest in more expensive fuel efficiency technology — technology that will deliver a far greater total volume of GHG reductions. Finally, the lack of effective sustainability criteria in the government's support for biofuels to date means that there are considerable doubts about the life-cycle GHG benefits (or other environmental benefits) of Canadian biofuels.[7]

3 (general). "Methods and assumptions in the analysis of implications for Canada"

Transport Canada must ensure the objectivity of the assumptions of its modelling exercise and present a range of results that includes sensitivity analyses. Automakers have an obvious incentive to inflate cost estimates, and it will be important to prevent this from affecting the quality of the analysis. A review of previous cost analyses of pollution reductions found that the auto industry has "historically overestimated the actual costs by a factor of about 2 to 10 times" and "a typical regulator estimate of actual automaker compliance costs are 1 to 2 times the actual costs."[8]

Accordingly, Transport Canada should be careful to clearly present the limitations, data limitations[9] and assumptions of its modelling exercise. For example, modellers can only consider the use of known technology, and therefore have difficulty including the effects of technological innovation. Moreover, the type of cost-benefit analysis that Transport Canada has obtained from the U.S. Department of Transportation (DOT) through a Memorandum of Understanding assumes that all manufacturers will continue to build all of their current nameplates; this ignores the possibility that automakers may choose to shift their fleet towards new and more fuel efficient vehicles. The presentation of Transport Canada's modelling results as being inherently conservative will allow policy makers to assess the completeness and importance of the cost-benefit analysis more accurately.

In order to present a more complete analytical "picture" to policymakers, Transport Canada should present the conclusions of its cost-benefit analysis in two ways. The department has already committed to performing an economy-wide social cost-benefit analysis of fuel efficiency

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[6] H.R. 6: Energy Independence and Security Act of 2007. Available online at http://www.govtrack.us/congress/billtext.xpd?bill=h110-6&show-changes=0.

[7] For more information on biofuel sustainability criteria, see Jesse Row, *Submission to the Parliamentary Standing Committee on Natural Resources Re: Renewable Fuels* (Drayton Valley, AB: The Pembina Institute, 2006). Available online at http://climate.pembina.org/pub/1289.

[8] Roland Hwang and Matt Peak, *Innovation and Regulation in the Automobile Sector: Lessons Learned and Implications for California's CO_2 Standards* (Washington, DC: Natural Resources Defense Council, 2006), 1. Also available online at http://docs.nrdc.org/air/air_08030301A.pdf.

[9] This is especially important in the event that auto manufacturers fail to provide their production plans to Transport Canada.

standards in Canada.[10] To complement this, Transport Canada should also present an analysis of the financial costs or benefits to consumers of the fuel efficiency standards under consideration, using the approach developed in California. This second type of analysis reflects the fact that the economic decisions made by vehicle manufacturers are dependent on a large variety of factors (including tax levels, competitiveness concerns, labour force, etc). Only some of these factors can be captured in a given model, and thus any modelling exercise can only ever approximate the economic effect of a policy on a certain sector or on Canada's economy as a whole. A "narrower" financial analysis of effects on consumers therefore provides a focused and valuable complementary set of information to policy makers.

3 (third bullet). "Methods and assumptions in the analysis of implications for Canada, including... [the] discount rate for valuation of costs and benefits in future years"

The economic literature reveals an extensive and ongoing debate on the appropriate discount rate for future costs and benefits. Given the existence of this variation, we urge Transport Canada to model a range of discount rates that includes those used in prominent climate change modelling analyses such as the Stern Review of the Economics of Climate Change,[11] and to present a range of results that includes a sensitivity analysis when the modelling results are published.

For all key economic variables, including discount rate and rebound effect, Transport Canada should attempt to base its parameters on observed behaviour and to ensure that recent, relevant analysis is reflected.[12]

3 (fourth bullet). "Methods and assumptions in the analysis of implications for Canada, including... monetary values of GHGs"

Canadian analysis and policy on GHG pricing has evolved rapidly in recent months, and Transport Canada must reflect this in its choice both of a price level for GHG emissions and the social cost of damage from GHG pollution.

The Government of Canada has adopted a target of reducing Canada's GHG emissions to 20% below the 2006 level in 2020 and to 60–70% below the 2006 level in 2050. The National Round Table on the Environment and the Economy (NRTEE) has completed a study that showed that reaching the government's 2020 target will require a "carbon" price[13] of about $75/tonne CO_2e (2003 dollars) in 2020.[14] Given the "survival rates" of vehicles on the road in Canada, fuel

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[10] Transport Canada, *A Better Canada — A Cleaner Environment: The Development of Motor Vehicle Fuel Consumption Regulations, Technical Discussion Paper* (Ottawa, ON: Government of Canada, 2008). Also available online at http://www.tc.gc.ca/pol/en/environment/FuelConsumption/pdf/TechnicalMeetingDocument.pdf.

[11] The Stern Review is available online at http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm.

[12] For example, Transport Canada's *Technical Discussion Paper* (see following footnote) notes at page 10 the recent work by Small and Van Dender for California's standards evaluation, which found small and declining rebound values. This analysis should be included, with appropriate adjustments made for Canadian income levels, in Transport Canada's study.

[13] The word "carbon" is used here as a shorthand for all six of the GHGs covered by the Kyoto Protocol (of which carbon dioxide is the largest component). The abbreviation "CO_2e" refers to "carbon dioxide equivalent," a standard measure which incorporates all six of these gases.

[14] National Round Table on the Environment and the Economy, *Getting to 2050: Canada's Transition to a Low-Emission Future* (Ottawa, ON: National Round Table on the Environment and the Economy, 2008), 32–33. Also available online at

efficiency standards in effect until 2020 will influence Canada's fleet for a decade or two beyond 2020. Looking ahead to 2030 and 2040, the NRTEE found that carbon prices in the range of $150–300/tonne CO_2e (2003 dollars) will be required to stay on track toward the government's 2050 target. (The NRTEE report notes increasing uncertainty about the projected emission price levels as the time period increases.)

The Government of Canada's own "Turning the Corner" plan projects reaching a carbon price of about $65/tonne CO_2e by 2018.[15] In its 2008 budget, the Government of British Columbia introduced a carbon tax that will rise to $30/tonne CO_2e in 2012. These initiatives should serve two purposes in Transport Canada's analysis: to increase the price of fuel that consumers will pay, and thus increase consumer savings from fuel efficiency; and to provide a lower bound for the carbon prices that Transport Canada should consider in its modelling.

Outside of Canada, the European Union's Emissions Trading System (EU ETS), a cap-and-trade market in operation since 2005, is currently charging €22/tonne CO_2e (equivalent to about $34/tonne) for December 2008-vintage allowances.[16] The EU ETS is currently the world's largest carbon market, but regional cap-and-trade markets like the Western Climate Initiative or the Regional Greenhouse Gas Initiative will soon set carbon market prices in the United States and some Canadian provinces as well.

In its 2007 Fourth Assessment Report, the Intergovernmental Panel on Climate Change found that a carbon price of US$50/tonne CO_2e would leverage global emission reductions of 20–35% below business-as-usual emission levels by 2030 in a scenario of rapid economic growth, or reductions of 27–52% below business-as-usual levels in a lower-growth scenario.[17] Even those reduction levels still fall significantly short of the minimum reductions needed to have a good chance of avoiding dangerous climate change.

It is important that Transport Canada's analysis reflects not only the price of carbon imposed by governments through taxes or set in markets. In a social cost-benefit analysis, Transport Canada must also include more direct estimates of the damage caused by each additional tonne of GHG pollution that a less-stringent vehicle emission regulation sends into the atmosphere. The UK government has already developed a methodology for doing this, using an estimate called the "shadow price of carbon," or SPC. The way in which government agencies should use this price, and the rationale for the chosen price levels, are explained in a December 2007 policy document entitled *The Social Cost of Carbon and the Shadow Price of Carbon: What they Are, and How To Use Them in Economic Appraisal in the UK*.[18] The document states that:

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http://www.nrtee-trnee.ca/eng/publications/getting-to-2050/Getting-to-2050-low-res-eng.pdf. The government's target for 2020 is equivalent to about 610 megatonnes CO_2e.

[15] Environment Canada, *Turning the Corner: Detailed Emissions and Economic Modelling* (Ottawa, ON: Government of Canada, 2008), 7. Also available online at http://www.ec.gc.ca/doc/virage-corner/2008-03/pdf/571_eng.pdf.

[16] http://www.europeanclimateexchange.com (accessed March 13, 2008).

[17] Intergovernmental Panel on Climate Change, "Summary for Policymakers," in Metz et al., eds, *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, (Cambridge, UK and New York, NY: Cambridge University Press, 2007), 29. Also available online at http://www.ipcc.ch/SPM040507.pdf. In the deck presented at its March 10, 2008 consultation session, Transport Canada used carbon prices from "IPCC '95". The IPCC's 2007 Fourth Assessment Report represent the most current IPCC thinking and should replace the 1995 conclusions in Transport Canada's analysis.

[18] This document is available online at http://www.defra.gov.uk/environment/climatechange/research/carboncost/pdf/background.pdf.

> *The SPC should be incorporated into policy and investment appraisals in the same way as any other cost or benefit. It should be incorporated consistently into all analysis to support decision-making. Plainly this applies when choosing among alternative carbon abatement measures.*

For the year 2011, the UK's recommended shadow price of carbon is £27.6/tonne CO_2 ($55). For the year 2020, the price level is £32.9/tonne CO_2 ($66), and in the year 2040, the price level reaches £48.9/tonne CO_2 ($98). These prices represent a proxy for the social cost of GHG pollution caused by emissions from a developed country responsible for about 2% of global emissions, and are thus an excellent guide for Canada's government in its own cost-benefit analyses.

Finally, Transport Canada should also note the NRTEE's advice on cumulative emissions, which is:

> *In choosing a GHG emission reduction pathway, one should consider not only the annual reduction target, but the potential cumulative emission reductions associated with the pathway.*[19]

Cumulative emissions, not annual emissions in a target year, determine the accumulation of GHGs in the atmosphere, which is what determines the severity of climate change that Canada and the world will experience. Thus, pathways that reduce emissions more rapidly will produce lower levels of cumulative emissions and be more environmentally beneficial. Transport Canada should reflect this fact in its modelling exercise by ensuring that cumulative emissions are properly valued.

5. "The implications of the emergence of state/provincial standards, including those in California, for national regulations"

In launching this consultation process, Transport Canada noted "the Government of Canada's responsibility to lead on these issues in order to provide a nationally consistent level of protection for all Canadians."[20]

The same document notes that, while the Government of Canada is committed to developing standards "as least as stringent as those in the U.S.," four Canadian provinces have already committed to the more stringent California clean car standards, as have 15 other U.S. states.[21] Given the near certainty that California will receive its waiver eventually (whether through a legal decision or once a new President takes office), it seems all but inevitable that some provinces will regulate their vehicle fleets at California levels. In that context, the only way for the federal government to provide a "consistent level of protection" for all Canadians is to meet or exceed the California standards.

In fact, "levelling up" to the California standards (or better) may be the only way for the federal government to preserve the environmental benefit of the action that British Columbia, Québec, Nova Scotia and Prince Edward Island have committed to. That's because the competitor standard, that created by the U.S. *Energy Independence and Security Act*, is based on a national

[19] National Round Table on the Environment and the Economy, 19.
[20] Transport Canada, *A Better Canada — A Cleaner Environment: The Development of Motor Vehicle Fuel Consumption Regulations*, 4.
[21] Ibid., 2.

fleet average. If Canada were to adopt national fleet average standards set at similar levels to the U.S. federal standards, the presence of more efficient fleets in the four "California" provinces would allow other provinces' fleets to fall below even the less stringent national average level. This would have the effect of cancelling out the GHG benefits achieved in the California-level provinces.

Transport Canada's cost-benefit analysis must include a full assessment of California's clean car regulations, as they are clearly the approach that best meets the Government of Canada's criteria of a "stringent, dominant North American standard." The states that have already adopted California's standards already represent a significant fraction of the U.S. population and the U.S. market for vehicles; in Canada, the four provinces contain over 40% of Canada's population.

The superior environmental stringency of California's standards in a North American context is indisputable, although they are not among the world's leading standards.[22] A recent comparison of the cumulative GHG emission reductions in Canada resulting from the U.S. federal standards and the California standards found the following levels of cumulative GHGs reduced (expressed in megatonnes (Mt) of CO_2e):[23]

	Federal	**California**
By 2016	12	29
By 2020	44	87

By both 2016 and 2020, California's standards produce roughly twice the GHG reductions that the U.S. federal standards do.

California's standards carry other important advantages. Canada's fleet is already significantly more efficient that the U.S. fleet., because new cars in Canada are considerably more efficient than those in the U.S., and light trucks occupy a smaller proportion of the market in Canada.[24] Given Canada's advanced starting point, the U.S. federal standards would not represent an appropriate rate of improvement for the Canadian fleet. In this context, the California standards, which were judged to be "the maximum feasible and cost-effective reduction of greenhouse gas emissions from motor vehicles"[25] in California, would clearly not be "the maximum feasible and cost-effective reduction" of GHG emissions from Canada's fleet.

General Comments

Canadian GHG reductions. In order to avoid dangerous climate change, widely defined as a global average temperature increase of 2°C relative to the pre-industrial level, industrialized

[22] Transport Canada, *Background Paper for the Development of Motor Vehicle Fuel Consumption Regulations* (Ottawa, ON: Government of Canada, 2008), 20 (Figure 1). Also available online at http://www.tc.gc.ca/pol/en/environment/FuelConsumption//pdf/BackgroundPaper.pdf.

[23] California Air Resources Board, *Comparison of Greenhouse Gas Reductions for the United States and Canada Under U.S. CAFE Standards and California Air Resources Board Greenhouse Gas Regulations* (Sacramento, CA: California Air Resources Board, 2008), Table 18. Also available online at http://www.arb.ca.gov/cc/ccms/reports/pavleycafe_reportfeb25_08.pdf. Although the baseline for GHG reductions is not stated, it appears to be projected business-as-usual emissions.

[24] Transport Canada, *Background Paper for the Development of Motor Vehicle Fuel Consumption Regulations*, 7–10.

[25] Assembly Bill No. 1493, Chapter 200, Sec. 3. Available online at http://www.calcleancars.org/ab1493.pdf.

countries including Canada need to make deep reductions in their GHG emissions — 25–40% below the 1990 level by 2020 and 80–95% below 1990 by 2050.[26,27] At the December 2007 United Nations climate conference in Bali, Canada agreed to negotiations on a post-2012 global climate agreement guided by the science-based target range of 25–40% reductions by industrialized countries below the 1990 level by 2020.[28] In this context, all sectors of Canada's economy must make an appropriate contribution to reaching the target.

Transportation represents a quarter of Canada's national GHG emissions, with personal vehicles responsible for 10% of the total. Any fuel efficiency standards chosen by Transport Canada must make a contribution commensurate with vehicles' share of national emissions.

The Government of Canada's 2020 target for Canada's total emissions unfortunately falls far short of a science-based target. However, the government has indicated that even reaching this target will require a 35 Mt reduction in the transportation sector's annual emissions below business-as-usual in 2020.[29] When it decides on fuel efficiency target levels, Transport Canada must therefore credibly and publicly demonstrate that its proposed regulations, when combined with other transportation policies, are expected to achieve at least a 35 Mt reduction in annual emissions by 2020.

Given the urgency of climate change, and the scale of the emission reductions needed in Canada, making reductions below "business as usual" is not enough, especially when the effects of Transport Canada's decisions will be felt well into the 2030s. Absolute reductions in emissions well below current levels are required across the economy, including in the transportation sector. The government's own modelling of U.S. federal standards in Canada — which result in a fuel efficiency improvement of about 20% for Canada's fleet, relative to current levels — still leaves Canada's 2020 emissions from transportation well above the sector's 2006 emission level.[30] Transport Canada must investigate the full costs and benefits of making absolute emission reductions (i.e., reductions well below current levels) in Canada's fleet of personal vehicles. This requires consideration of "breakthrough" technologies like electric vehicles.

An independent analysis of the efficiency standards needed to achieve the science-based target (see above) of a 25% absolute reduction in GHG emissions below the 1990 level in 2020 found that fuel efficiency regulations would need to reduce new passenger car and light truck fuel consumption rates to 2.5 L/100 km and 3.6 L/100 km respectively by 2020.[31] Although the rate of change is large, it is important for Transport Canada to include these kinds of scenarios in its planning, so that policymakers have the option of choosing science-based deep GHG reduction

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[26] Gupta et al., "Policies, Instruments and Co-operative Arrangements," in Metz et al., eds, *Climate change 2007: Mitigation. Contribution of Working group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, UK and New York, NY: Cambridge University Press, 2007), 776. Also available online at http://www.mnp.nl/ipcc/pages_media/AR4-chapters.html.

[27] These emission reductions are based on stabilizing the atmospheric GHG concentration at 450 parts per million CO_2e, which corresponds to only about a 50% probability of respecting the 2°C limit.

[28] See the "Conclusions adopted by the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its resumed fourth session held in Bali, 3–11 December 2007." Available online at http://unfccc.int/files/meetings/cop_13/application/pdf/awg_work_p.pdf.

[29] Environment Canada, *Turning the Corner: Detailed Emissions and Economic Modelling*, 10.

[30] Ibid., 10, 23.

[31] David Greene, *"25 by 20:" Vehicle Stock Modelling of Fuel Consumption Improvements Capable of Reducing the Greenhouse Gas Emissions of Canadian Light-Duty Vehicles 25% by 2020* (paper prepared for Pollution Probe, 2006), Sec. V.

targets for Canada's vehicle fleet. As more and more nations adopt deep GHG reduction targets in their own economies,[32] automakers will find global markets for the fuel-efficient vehicles and cutting-edge technology that more aggressive efficiency standards would produce.

Budget 2008. The 2008 federal budget provided "$250 million over five years to support strategic, large-scale research and development projects in the automotive sector in developing innovative, greener and more fuel-efficient vehicles."[33] This funding commitment strengthens the case for Transport Canada to require automakers to go beyond the minimum level represented by the U.S. federal standards.

Transparency. Transport Canada must commit to making the results of its social cost-benefit analysis public, including full details of assumptions, data, methodology, and baselines. As noted above, a narrower "financial" analysis of consumer costs should be undertaken in addition to the economy-wide analysis, and fuel efficiency standards ambitious enough to lead to absolute reductions in emissions below current levels should be modelled as well. The cost-benefit analytical approaches used to set standards in the jurisdictions with leading fuel economy, including the European Union, China and Japan, should be considered in addition to the approaches used in the U.S. The U.S. is a global laggard on vehicle fuel economy, so its relatively unsuccessful approach to standard-setting must not be the only one considered by Transport Canada.

Review provision. The history of the first decade of CAFE standards shows that the fuel economy of vehicle fleets can change very rapidly.[34] Transport Canada must build in a review provision to assure that the fuel efficiency standards it selects remain stringent enough in the years to come.

The heavy industry regulations proposed in the government's *Regulatory Framework for Air Emissions* are to be reviewed in 2012, and they cover infrastructure that will last for multiple decades. Given the much shorter "survival rates" of personal vehicles, and the rapid evolution of climate policy in Canada, the motor vehicle fuel efficiency regulations that Transport Canada selects should be regularly reviewed at intervals of no more than three years.

Costs per tonne. Economic modelling may show that the costs per tonne of emission reductions are relatively high for vehicle fuel efficiency regulations. As noted above, all sectors will be required to make absolute reductions in GHG emissions in order to attain deep reduction targets in Canada, and that includes the personal transportation sector. In addition, the Government of Canada has already implemented several policies with very high costs per tonne of emission reductions, including tax credits for transit passes and support for biofuels. Clearly, the government identified benefits that outweighed the high costs per tonne in these areas. The government should be ready to take a similar approach to ambitious vehicle fuel efficiency regulations.

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[32] See Clare Demerse and Matthew Bramley, *Canada in Bali: A Backgrounder on the 2007 UN Climate Negotiations*, (Drayton Valley, AB: The Pembina Institute, 2007), 4. Also available online at http://climate.pembina.org/pub/1552.

[33] Department of Finance Canada, *The Budget Plan 2008: Responsible Leadership* (Ottawa, ON: Department of Finance Canada, 2008),123. Also available online at http://www.budget.gc.ca/2008/pdf/plan-eng.pdf.

[34] Transport Canada, *Background Paper for the Development of Motor Vehicle Fuel Consumption Regulations*, 7–10.

Conclusion

In setting Canada's first-ever motor vehicle fuel efficiency regulations, Transport Canada has an important opportunity to craft world-leading standards that produce major environmental gains and drive the development of green vehicle technology in Canada.

The federal government's objectives are "to maximize... environmental and economic benefits" and "to provide a nationally consistent level of protection" for all Canadians. Only standards that match or exceed the fuel efficiency levels proposed in California are capable of meeting these important goals.