A Strong Canadian Auto Industry in a Fuel Efficient Future

A commentary on automotive industry policy in the context of climate change, vehicle fuel efficiency regulations and carbon-constrained markets

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About this Commentary

Pollution Probe believes that Canada needs a long-term vision and strategy to build a strong and globally competitive auto sector for the future. The auto manufacturing industry in Canada is composed of vehicle assembly operations and component producers. Generally, these facilities supply foreign automotive markets, exporting mainly to the US, generating significant wealth for Canada. The consumer market for automobiles in Canada is mainly supplied with imported models, thus expanding choice for Canadians. The right mix of industry policies and consumer market policies could help create the conditions for the long-term success of Canada's auto industry. A crucial element of this success will be the capacity for this industry to build products that are consistent with the goals of environmental and economic sustainability.

This commentary begins with a discussion of why fuel efficiency standards are needed and why governments around the world are implementing regulations. Aspects of the auto manufacturing industry and the consumer automobile market in Canada are then presented, followed by a discussion of how industry and market policies could be aligned to benefit the auto sector, consumers and the environment.

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Vehicle Fuel Efficiency and the Case for Regulated Standards

Environmental and economic circumstances have thrust auto sector policy into the headlights of government lawmakers in Canada and around the world. Primarily at issue is the need to address climate change, which will require significant reductions in greenhouse gas emissions from light-duty vehicles (e.g., passenger cars, minivans, pickup trucks, SUVs and other personal-use vehicles). A comprehensive solution will include fuel-conserving techniques, such as "eco-driving", more public education and information, possibly a fuel or carbon tax, and support for technology research and development. Generally, supporting a shift to a less automobile-dependent society is also needed.

Hard policy measures implemented by government, such as fuel efficiency standards, are needed because none of the aforementioned measures will be sufficient to draw into the market new vehicles that incorporate advanced technologies and designs that reduce fuel consumption. In theory and in practice, regulated standards work. Corporate Average Fuel Economy (CAFE) standards that were first established in the US in the mid-1970s required a doubling of new car fuel economy levels over a 10-year period. This single measure broke OPEC's control over global crude oil prices until the mid-1990s[1] and, to this day, continues to save the US 2.8 million barrels of oil per year and reduces emissions by 100 megatonnes of carbon annually.[2] The National Academy of Sciences in the US has calculated the cumulative economic benefits of CAFE to be in the range of $40–$80 billion in unadjusted dollars.[3]

The downsides experienced with improved fuel economy were few (e.g., in the US, generally, the auto industry continued to flourish under CAFE standards[4] and vehicle safety performance is better than ever[5] even though today's passenger cars are lighter than those of the pre-regulation era[6]), and now other nations around the world are also following a regulatory agenda for improving fuel efficiency.[7] But this was not always the

[1] Lovins, Datta, Bustnes, Koomey, Glasgow (2005). *Winning the Oil Endgame*, Rocky Mountain Institute. pp. xiii. Excerpt: "When the US last paid attention to oil, in 1977–1985, it cut its oil use 17 per cent while GDP grew 27 per cent. Oil imports fell 50 per cent, and imports from the Persian Gulf by 87 per cent, in just eight years. That exercise of dominant market power — from the demand side — broke OPEC 's ability to set world oil prices for a decade."

[2] Committee on the Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards, National Research Council (2002). *The Impact and Effectiveness of Corporate Average Fuel Economy (CAFE) Standards*, National Academies Press. pp.3.

[3] Ibid. pp. 20.

[4] Ibid. pp. 22–24.

[5] Ibid. pp. 25.

[6] *Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2007*, EPA420-R-07-008, Environmental Protection Agency, Ann Arbor, Michigan. Note: Compared to 1975 levels, average passenger car mass is lower, but light truck mass is higher.

[7] An, Gordon, He, Kodjak, Rutherford (2007). *Passenger Vehicle Greenhouse Gas and Fuel Economy Standards: A Global Update*, The International Council on Clean Transportation. pp. 8. Millikin (2007). *A Global Survey of Highly Fuel Efficient, Low Greenhouse Gas Emitting Vehicles*, Pollution Probe. pp. 3.

case. In Europe, for example, countries first experimented with higher fuel taxes instead of fuel efficiency standards. This strategy was partly successful — higher fuel prices, combined with other economic and structural factors, kept per-capita fuel consumption levels lower in Europe than in other parts of the world, and lower taxes on diesel compared to gasoline led to wider market adoption of diesel-powered vehicles. This is an important factor because the properties of diesel permit engines to operate on a more mechanically efficient cycle, essentially generating more power from less fuel. However, higher fuel prices did not result in sufficient market demand for vehicles that incorporated advanced technologies to reduce fuel consumption.

In the early 1990s, European regulators concluded that automakers were not making optimal use of available technology advancements to improve fuel efficiency levels, despite the pricier fuel regime.[8] Opportunities to improve fuel efficiency were often traded off against increases in other vehicle attributes, such as horsepower, acceleration rate, speed and weight. This is similar to what happened in North America when, after the 1980s, lawmakers and regulators ceased to significantly tighten CAFE standards. Increases in vehicle weight were partly the result of added safety components, often required by law, but were mostly the result of increases in vehicle size and features. Other loads, such as entertainment and passenger comfort systems, also draw an increased share of the engine's power output.

To reverse this trend and to make fuel efficiency a top priority for automakers, the European Commission negotiated a voluntary target with the auto industry — reduce tailpipe CO_2 emissions by 25 per cent from the 1995 fleet-average level of 180 g/km to 140 g/km by 2008. In 2006, it was estimated that only five automakers were on track to meet this goal: Fiat, Citroën, Renault, Ford and Peugeot.[9] Unsatisfied with the voluntary performance of three-quarters of the industry, the Commission is now preparing to implement a regulated standard of 120–130 g/km to be achieved by 2012.[10]

Europe's shift from taxation to regulation is consistent with economic theory on fuel prices and fuel efficiency. While the expectation is that higher fuel prices should lead people to be more frugal with fuel use, and that this should lead people to seek more fuel efficient vehicle options as a way to save fuel, the reality is that demand for fuel efficiency-enhancing technology content in a new vehicle remains — at best — only part of a diffuse response to the price signal. The figures on page 3 offer one explanation why: as technology is added to a vehicle to raise fuel economy, the incremental price of the vehicle increases — but so do the fuel savings. The difference between fuel savings and price increase represents the net value to the consumer. As shown in Figure 1A, discounting the fuel savings over the life of the vehicle means the maximum net value is achieved at 33 mpg, even though 39 mpg is achievable *at no net cost*. The economically rational consumer would, therefore, not pay for 39 mpg despite the environmental benefits that would result if everyone paid for this level of fuel efficiency (i.e., choosing optimal, cost-effective fuel efficiency over

[8] Oliver (2005). *Greenhouse Gas and Vehicle Fuel Efficiency Standards for Canada* , Pollution Probe. pp.130.

[9] European Federation for Transport and Environment. (2006). *T&E Bulletin, No 152, October 2006*. www.transportenvironment.org/docs/Bulletin/2006/2006-10_bulletin152_web.pdf

[10] European Commission proposal to limit the CO_2 emissions from cars (December 2007). http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1965&format=HTML&aged=0&language=EN&guiLanguage=en

Figure 1A: Price and Value of Increased Fuel Economy to Passenger Car Buyer, Using NRC Average Price Curves and Valuing Fuel Savings Over 14-year Vehicle Life

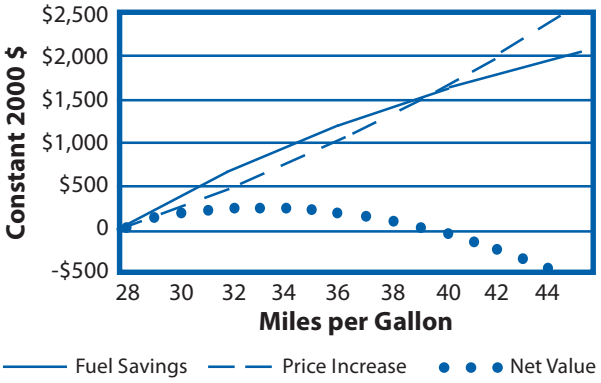
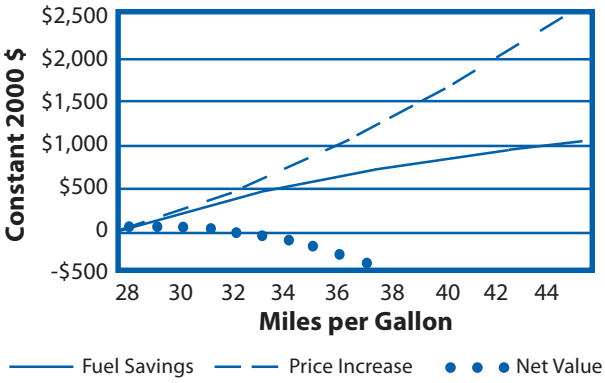


Figure 1B: Price and Value of Increased Fuel Economy to Passenger Car Buyer, Using NRC Average Price Curves with a 3-year Simple Payback



Note: Figures A and B assume cars driven 15,600 miles per year when new, decreasing at 4.5 per cent per year, 12 per cent discount rate, 14-year vehicle life, $1.50 per gallon gasoline, 15 per cent shortfall between EPA test and on-road fuel economy.
Source: Greene, David L. and Andreas Schafer. 2003. *Reducing Greenhouse Gas Emissions from US Transportation*. Pew Center on Global Climate Change. pp. 15.

optimal fuel savings). In reality, consumers are unlikely to conduct an accurate cost-benefit analysis of fuel efficiency and probably attach little value to real fuel savings. This point is demonstrated in Figure 1B, in which the result of a simple three-year payback calculation on expected fuel savings yields no net value at all.

This example illustrates that, regardless of how high fuel prices may rise, consumers perceive little economic incentive in paying for added technology to achieve optimal, cost-effective levels of fuel efficiency. This constitutes a failure of the market[11] to accurately value improved fuel efficiency. The economic and environmental benefits are evident and measurable. Yet, when faced with the choice of spending equivalent amounts of money on fuel, or on fuel-saving technology, consumers are more likely to choose fuel. So how would consumers respond to higher fuel prices? To control expenses, it is just as likely that consumers would buy a cheaper vehicle instead of a more fuel efficient one. Or perhaps consumers would choose to drive an older, value-depreciated car, or perhaps they would seek other modes of transportation altogether. Generally speaking, increases in fuel prices have not translated into a corresponding increase in average new vehicle fuel efficiency levels or the use of technologies to reduce fuel consumption.[12] Some fuel efficiency improvements have been estimated for model years 2006 and 2007 in

[11] Greene, German (2007). *Automotive Fuel Economy: The Case for Market Failure*, presentation at UC-Davis Asilomar Conference. www.its.ucdavis.edu/events/outreachevents/asilomar2007/presentations/Day%202%20Session%202/The%20Case%20for%20Market%20Failure%20-%20Asilomar%20Aug07.pdf. Greene (1997). *Why CAFE Worked*, Center for Transportation Analysis, Oak Ridge National Laboratory.

[12] *Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2007*, EPA420-R-07-008, Environmental Protection Agency, Ann Arbor, Michigan.

the US, yet these levels are still below the historic peak in 1987.

In other words, by relying on fuel prices alone to achieve peak, cost-effective fuel efficiency levels one should expect suboptimal results. Standards are therefore required to address this market failure, particularly so if the policy objective is to integrate environmental and social benefits. The European Commission understands this, and it explains their current move toward regulation. Indeed, consumers seem to understand it, as well. Surveys show that fuel economy ranks low among consumers' reasons for new car purchases,[13] yet polls also demonstrate overwhelming public support for fuel efficiency standards.[14]

Japan and China have also implemented regulatory standards for new vehicles. The State of California has set GHG emissions standards that 18 other states have adopted, or have announced intentions to do so.[15] Recent US court decisions are also driving federal action on GHG emissions rules, and the US government is increasing CAFE standards to 35 mpg by 2020.

This commentary focuses on Canada's commitment to implement a regulated fuel consumption standard, beginning in the 2011 model year.

[13] German (2007). *Advanced Technologies: Diesels and Hybrids*, referencing *Strategic Vision New Vehicle Owner Survey 2007* in a presentation at an International Council on Clean Transportation workshop. www.theicct.org/documents/German_Adv_tech_-_hybrids_&_diesels.pdf

[14] Gregg, Kelly, Sullivan and Woolstencroft (2007). *A Report To The Globe and Mail and CTV State of Canadian Public Opinion: The Greening of Canada*, The Strategic Council. Martin Redfern. (2005). *Public Views on Vehicle Fuel Efficiency Standards*, Leger Marketing.

[15] Green Car Congress (28 November 2007). *New Mexico Becomes 13th State to Adopt California GHG Limits on New Cars*. www.greencarcongress.com/2007/11/new-mexico-beco.html#more.

What kind of standard should Canada have and how stringent should it be?

The answer depends partly on the objective of the policy. In Europe, the vehicle standards are designed to reduce greenhouse gas emissions. These reductions are part of a comprehensive plan to avert dangerous climate change by stabilizing atmospheric GHG concentrations (at a level consistent with less than a two-degree rise in global average temperature). In other words, the plan has a science-based target and its various policies (including the vehicle standards) are driven by an environmental objective. This is something the EU standards have in common with California's new vehicle GHG emissions standards: reducing GHG emissions is the primary goal. In contrast, the existing US CAFE standards have no direct environmental component — CAFE is mainly an economic policy intended to shield the US from oil price volatility (respecting "the need of the nation to conserve energy").[16]

Regardless of what drives policy, the stringency of all standards is usually constrained by what is believed to be technologically and economically feasible. Understanding the extent to which Canadian standards can drive technological improvements requires an understanding of the nature of our domestic auto industry, our consumer market for automobiles and our place in the global auto industry. Pollution Probe lacks the resources to conduct the detailed industry and market analyses we believe are required to tackle this question. However, we have investigated sales and production statistics, where available, as well as general industry trends, to better understand the issues. The following sections summarize our findings to date.

[16] US Code Title 49 Chapter 329. Oliver (2005). *Greenhouse Gas and Vehicle Fuel Efficiency Standards for Canada*, Pollution Probe. pp. 31–33

The Auto Manufacturing Industry in Canada

Canada is a major producer of automobiles and is home to a diverse automotive industry. In terms of vehicle assembly, Canada is the eighth-largest producer in the world.[17] Canada is also home to one of the world's largest automotive companies, Magna International, operating approximately 300 manufacturing plants and product development and engineering centres worldwide[18] and producing finished vehicles for top brands, including Mercedes-Benz, BMW, Chrysler and Saab.[19]

Magna International is the only major international auto producer based in Canada — all other operations are foreign-owned and directed. Canada is fortunate in this regard, since increasingly the design and manufacture of components (i.e., "parts") is being outsourced to automotive component suppliers, which is increasing their revenue potential. According to a 2007 report[20] by Merrill Lynch, five fundamental factors are driving growth among component suppliers:

1. increased component system content in new vehicles
2. increased outsourcing by OEMs (i.e., Original Equipment Manufacturers: primary automakers, such as Toyota, GM, Ford, Renault-Nissan, etc.)
3. industry consolidation
4. emerging market expansion
5. new customer penetration

The report named Magna as one of the top five global suppliers, based on revenue, for component systems.

Magna was also named in a 2006 Merrill Lynch report[21] as an investment play to cleaner cars in a possible future of carbon-constrained markets. In the face of global regulatory forces and market drivers for higher fuel efficiency levels, Magna is considered in the report to be well-positioned with its market-leading high-pressure hydroforming systems, which are used to manufacture lighter, stronger components.

Now that most major automotive jurisdictions have implemented some form of fuel efficiency standards (or plan to), the global shift towards a more fuel efficient vehicle market is underway. **How is Canada's auto industry positioned to benefit (or suffer) from this shift?** Pollution Probe cannot definitively answer this question. But given that Magna is recognized as a global leader in fuel efficient technology, it is encouraging that the company is headquartered in Canada. It also helps that the expansion of vehicle production capacity in Canada is being led by the "New Domestics" (i.e., Honda and Toyota), which currently build models that are relatively more fuel efficient, including the Honda

[17] Industry Canada (2006). *Cars on the Brain — Canada's Automotive Industry*. pp. 4. http://strategis.ic.gc.ca/epic/site/auto-auto.nsf/en/am02027e.html

[18] Magna International Inc., company website: www.magna.com/magna/en/default.aspx

[19] Magna Steyr, company website: www.magnasteyr.com/?rdeLocaleAttr=en

[20] Merrill Lynch (2007). *Who makes the car — 2007*.

[21] Merrill Lynch (2006). *Alternatives for the clean car evolution*. www.wri.org/climate/pubs_description.cfm?pid=4251

Civic and Toyota Corolla. A 2007 report[22] from Statistics Canada shows that the New Domestics use fewer imported components in their vehicles than the traditional domestic manufacturers (i.e., General Motors of Canada, Ford Motor Company of Canada and Chrysler Canada), meaning more of their suppliers are local. This could also be good news for Canada's component suppliers, especially considering that Honda and Toyota situate more of their NAFTA-based production facilities in Ontario than other automakers.

Auto consultant Dennis DesRosiers believes a stronger component supplier (i.e., auto parts) industry is needed in Canada. The weakness in Canada's automotive sector, says DesRosiers,[23] is the parts industry. Past automotive industry policies have focused on increasing foreign investment in vehicle assembly operations. DesRosiers suggests attention be paid to smaller component suppliers in Canada who struggle to invest in their operations and compete with better capitalized companies in the US.

A breakdown of the auto industry by vehicle assembly and component manufacture shows that the value of assembled vehicle shipments is roughly twice the value of component shipments,[24] making vehicle assembly a very important part of the auto industry in Canada. Yet in terms of employment, jobs at Canada's 800+ automotive component operations outnumber vehicle assembly jobs approximately 2:1.[25] In total, Canada's auto industry (vehicle assembly and component operations combined) contributes two per cent to Canada's overall GDP and 12 per cent to manufacturing GDP.[26] In Ontario, which is home to most of Canada's auto companies, this translates to approximately five per cent of the province's GDP and 21 per cent of its manufacturing GDP.[27] Few other manufacturing-based industries can claim as much contribution to the national wealth as Canada's auto industry.

To ensure the continued success of Canada's domestic auto industry, consideration of the fundamental changes underway in auto industries and auto markets *in a global context* is needed. Relying on past industry policies and strategies for securing investment may not contribute to Canada's competitiveness in future global auto markets.

[22] Roy, Kimanyi (2007). *Canada's Changing Auto Industry*. Canadian Economic Observer, May 2007. Statistics Canada – Catalogue no. 11-010. www.statcan.ca/bsolc/english/bsolc?catno=11-010-X20070059639

[23] DesRosiers (2007). *State of the Canadian Automotive Sector*. Observations Vol. 21, No. 19. pp. 3–4.

[24] Industry Canada (2006). *Cars on the Brain — Canada's Automotive Industry*. pp. 2–3.

[25] Ibid. pp. 6

[26] Oliver (2005). *Greenhouse Gas and Vehicle Fuel Efficiency Standards for Canada*, Pollution Probe. pp. 23–24.

[27] Ibid.

The Consumer Automobile Market in Canada

While Canada is a major producer of automobiles, it is also a major consumer of automobiles and automotive products. Light-duty vehicle sales in Canada are on track to hit 1.7 million vehicles in 2007 (an increase over 2006).[28] However, as illustrated in Table 1, the majority of the vehicles purchased by Canadians are imported from other countries (approximately 82 per cent) while the majority of the vehicles built by Canadians are exported (approximately 88 per cent, exported mainly to the US).

Furthermore, compared to US consumers, Canadians tend to purchase smaller, more fuel efficient vehicles. Compact and subcompact cars represent more than half of all new passenger cars sold[29] and subcompacts are one of the fastest growing vehicle segments in the Canadian market. Small vehicles do not dominate domestic production, although the Honda Civic and the Toyota Corolla, which are high-volume sellers in Canada, are also produced here. This accounts for the much lower import

Table 1: 2006 Light-Duty Vehicle Production & Sales Statistics*

Company/Nameplate	Canadian Production	Exported Vehicles	Export Share of Production	Remaining in Canada	Canadian Sales	Import Share of Sales
DaimlerChrysler	601,199	569,308	94.7%	31,891	220,553	85.5%
Ford	205,313	191,700	93.4%	13,613	228,878	94.1%
General Motors	793,603	732,273	92.3%	61,330	415,753	85.2%
Honda (incl. Acura)	387,078	298,819	77.2%	88,259	165,985	46.8%
Toyota (not incl. Lexus)	317,433	243,895	76.8%	73,538	183,779	60.0%
CAMI (see note)	196,598	166,967	84.9%	29,631		
Other (estimated)					399,753	100.0%
Total	2,501,224	2,202,962	88.1%	298,262	1,614,701	81.5%

* Raw production and sales data sourced from the *DesRosiers Automotive Yearbook, 2007 Edition* and from DesRosiers Automotive Consultants. Export and import shares are calculated based on raw data. Small differences occurring between these and other published figures may occur due to differences in data collecting and reporting.

Note: CAMI produces light trucks with GM and Suzuki nameplates. Sales data for these nameplates are integrated into *General Motors* and *Other*.

[28] DesRosiers (2007). *State of the Canadian Automotive Sector*. Observations Vol. 21, No. 19. pp. 3.

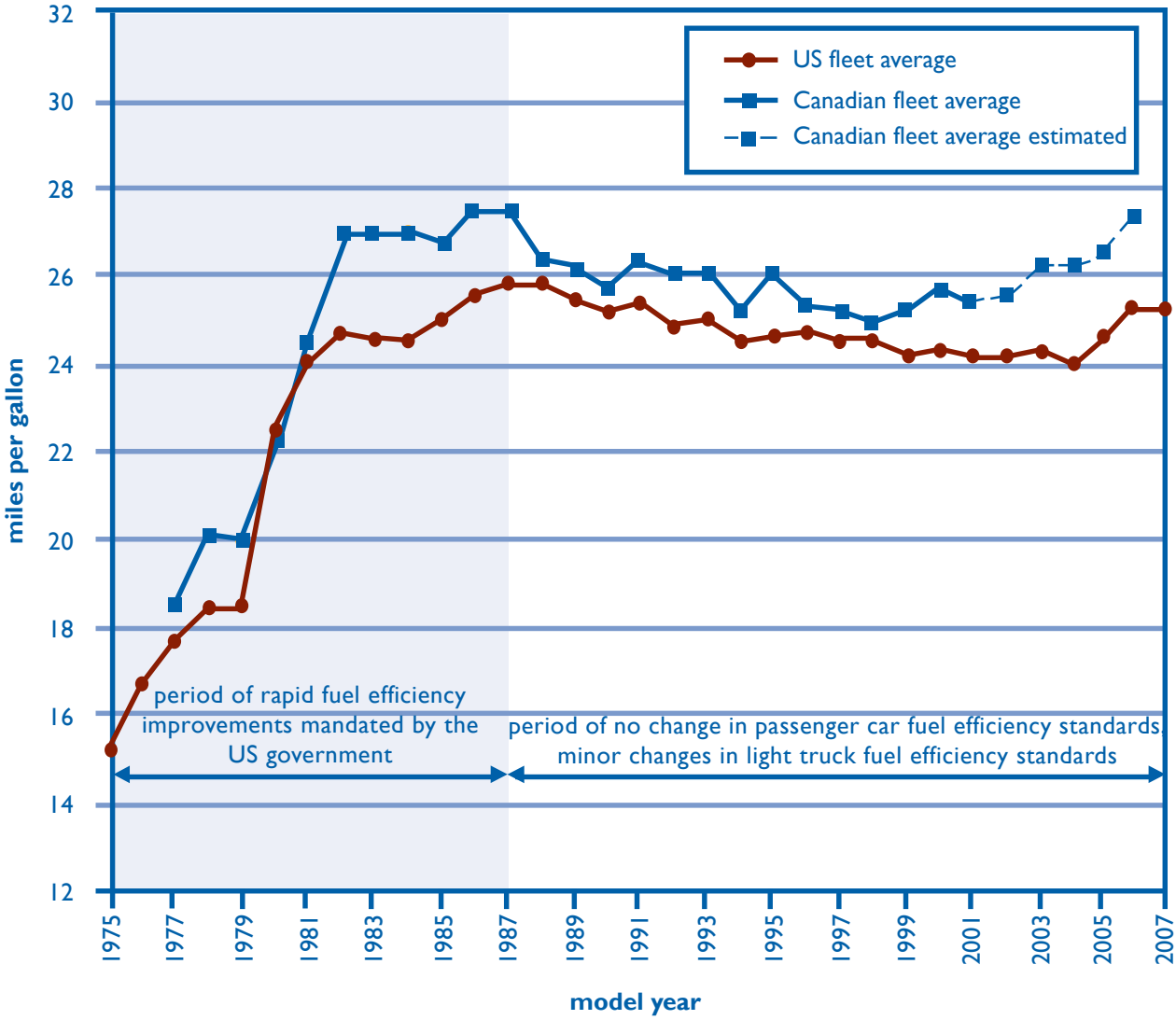
[29] DesRosiers Automotive Consultants Inc. (2007). *Market Snapshot, October 2007*.

share of Honda and Toyota vehicles sold in Canada, as shown in Table 1.

The US and Canadian vehicle markets are different in this way, but also in other ways. For example, several distinct models are marketed in Canada, but not in the US, such as the Nissan X-Terra and the Mercedes-Benz B-Class. Canada often serves as a testing ground for an imported model before it is introduced into the US market. Examples include the Smart fortwo cdi and the Toyota Echo (now marketed in Canada and the US as the Toyota Yaris).

Due to the differences in the Canadian and US auto markets, there is a fuel efficiency "gap" between the two countries. Figure 2 tracks fleet-average, new vehicle fuel economy levels in both countries since 1975. The gap illustrates the preference of the Canadian market for smaller or more fuel efficient models than the US.

Figure 2: Average Fuel Economy Levels of New Light-duty Vehicle Fleets (unadjusted EPA values)

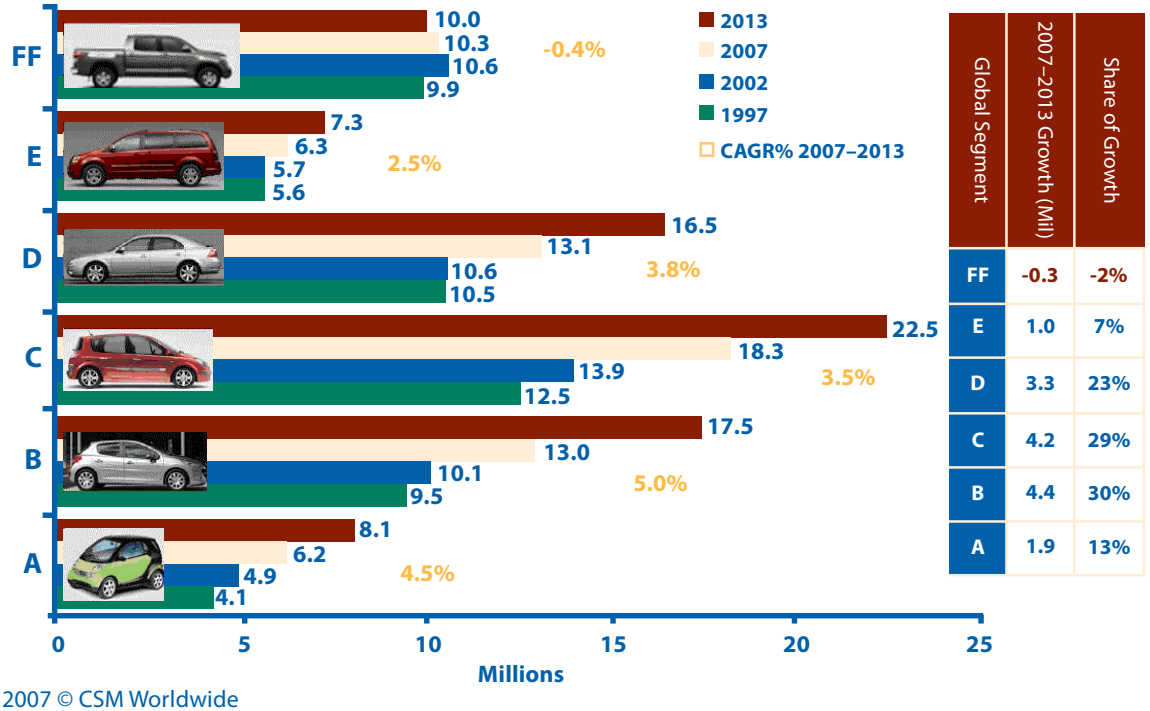


US data from US Environmental Protection Agency: *Light-Duty Automotive Technology and Fuel Economy Trends 1975 Through 2007;* Canadian data from Natural Resources Canada; Canadian estimates from Transport Canada.

These differences are important because they challenge the traditional assumption that the Canadian auto market is simply a scale-model of that of the US. They also raise questions about regulatory harmonization. For example, Canada's fuel consumption standards should require improvement against a Canadian baseline, rather than one adopted from another jurisdiction, such as the US. Otherwise, the potential of Canada's market to contribute to the global demand for fuel efficient vehicles and technologies will be limited. In other words, harmonization *on the effect* of standards has quite a different meaning than simply copying another jurisdiction's fuel efficiency targets. Indeed, true harmonization with other jurisdictions' fuel efficiency standards and policies implies that Canada's contribution should leverage more improvement and broaden the market for fuel efficient vehicles, so that new designs and technologies are brought to market with greater efficiency and cost-effectiveness.

The shift in Canada's auto market towards smaller vehicles is part of a developing global trend. Figure 3[30] projects the growth of global vehicle production by 2013 by vehicle segment,[31] in which the largest share of the growth is carried by smaller vehicle segments.

Figure 3: Global Outlook — Trends — Production by Global Segment

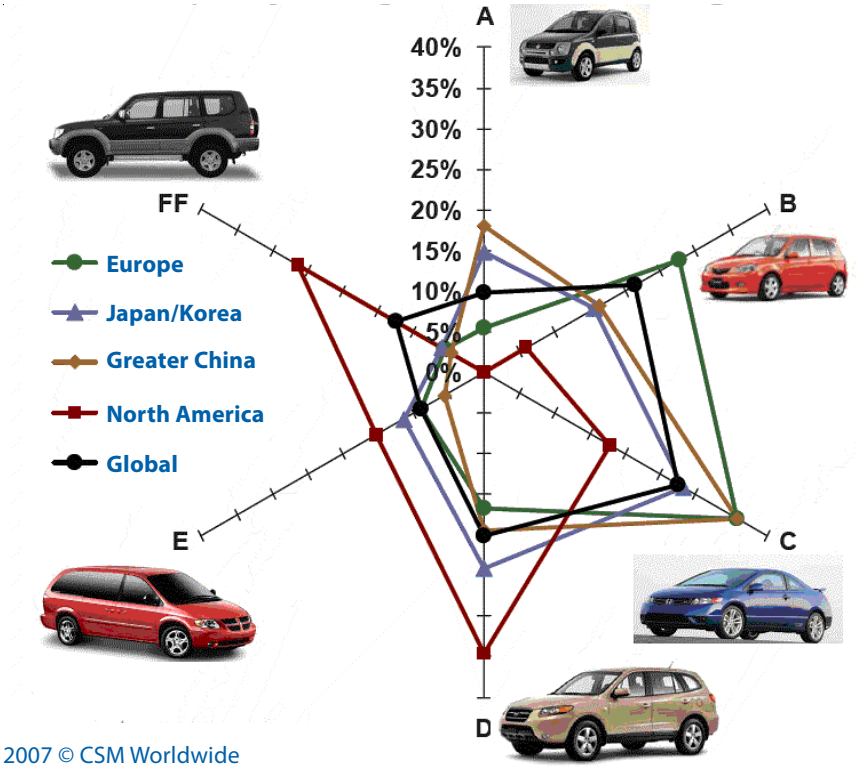


Global Segment	2007–2013 Growth (Mil)	Share of Growth
FF	-0.3	-2%
E	1.0	7%
D	3.3	23%
C	4.2	29%
B	4.4	30%
A	1.9	13%

[30] Haelterman (2007). From a presentation delivered at the Deloitte Canadian Automotive Insights Forum, *Global Automotive Overview*, Paul Haelterman (CSM Worldwide), October 4, 2007.

[31] In the US and Canadian context, vehicle segments are often defined by interior volume and are given descriptive names, such as full-size, mid-size, compact and subcompact. Globally, vehicle segments are normally size based and are classified as A-Class, B-Class, C-Class, D-Class, E-Class and Full Frame (FF – for most pickup trucks and large SUVs). The pictures are visual representations of the type of vehicle models that fall into each segment.

Figure 4: Global Outlook — Share by Major Region and Global Segment — 2013



- **Europe and Japan/ Korea focused on B- and C-segments, due to domestic market requirements and historical abilities**
- **Fewer space considerations and lower fuel costs drive North America toward C, D, E and Full-Frame**
- **Regions with a "segment" footprint that varies greatly from global average must specialize to drive exports**

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Figure 4[32] shows that North American production in 2013 will be fairly entrenched in the larger vehicle segments and full-frame models (e.g., pickup trucks, large SUVs), while the distribution of global production will be weighted towards the smaller vehicle segments.

Given Canada's general preference for smaller, more fuel efficient vehicle models, and given European and Asian producers' investment in smaller vehicle classes, it is perhaps not surprising that imported smaller vehicles are successful in Canada. An example is BMW's Mini Cooper: a small, fuel efficient vehicle imported from Europe and marketed in Canada at a premium price. This is not to overstate the role of Asian and European imports in the Canadian market — a substantial amount of Canada's imports arrive from the US and Mexico, as well. But vehicles imported from jurisdictions with more stringent standards for fuel efficiency and GHG emissions could play an important role in helping Canada achieve its goals of improved fuel efficiency and reduced GHG emissions levels.

Likewise, can Canada's fuel efficiency standards help to increase the market for fuel efficient vehicles outside of Canada (i.e., globally)? Canada's experience with the new ecoAuto Rebate and Green Levy programs indicate the answer may be "yes". Since the Vehicle Efficiency Incentive was introduced in Budget 2007,[33] some automakers have increased fuel efficiency levels in certain

[32] Ibid.

[33] March 19, 2007. www.budget.gc.ca/2007/bp/bpc3e.html#fuel-efficient

models to qualify for government rebates or avoid levies.[34] These improvements appear to be marginal and seem only to occur where vehicle fuel consumption ratings are near the sudden jumps in the rebate and levy schedules. However, it challenges the argument that Canada's market is too small to affect change.

These questions led Pollution Probe to commission a survey of highly fuel efficient vehicle models currently available in North American, European and Asian markets. The report summarizes major fuel efficiency and GHG emissions standards in force, or under development, in these jurisdictions. Pollution Probe wanted to know: What are the most fuel efficient, low CO_2-emitting vehicle models available globally? What technologies do they employ? Who builds them? Where are they sold? How are new technologies being incorporated into automakers' future vehicle plans?

We learned that the largest selections of fuel efficient vehicles happen to be offered in jurisdictions with more stringent standards; namely Europe and Japan. This should not be a surprise. After all, the largest selection of vehicles with the lowest *smog-forming emissions rate* is found in North America, where regulated standards on smog-forming emissions are the most stringent! In other words, fuel efficiency standards do not appear to limit consumer choice — they provide quite the opposite.

The report also shows that most major automakers compete for business in all major markets. For example, Ford sells some of the most fuel efficient models available in Europe. GM also sells fuel efficient vehicles in Europe — under the Chevrolet nameplate directly, through various wholly-owned subsidiaries, such as Opel/Vauxhall and Saab, or through various equity alliances, such as with Fiat. US- and European-based automakers also do business in Asian markets, often through similar partnerships (e.g., Renault-Nissan, Ford-Mazda, GM-Suzuki). Other companies, such as Honda and Toyota, do not appear to follow this strategy, instead competing directly in all the markets studied in the report.

Furthermore, advanced technologies, such as hybrid drivetrain systems, appear in all markets. China's market would have been the exception to this trend, were it not for the presence of the Toyota Prius, which appeared in each jurisdiction surveyed in this report. Most major automakers also have plans to deploy some form of advanced fuel-saving technology in a production vehicle by 2010.

The report, *A Global Survey of Highly Fuel Efficient, Low Greenhouse Gas Emitting Vehicles*, is available from Pollution Probe and can be downloaded at www.pollutionprobe.org/Publications/Air.htm.

[34] Greg Keenan. The Globe and Mail, October 17, 2007. *Honda squeaks through Ottawa's green gates*.

Aligning the Auto Industry and Market Policies

Canada, along with other industrialized nations, must contribute to the dramatic cuts in global GHG emissions that are required to avert the worst impacts of climate change, thus preserving the environment and the economy for our own prosperity and for future generations. Pollution Probe believes that all relevant information needs to be considered when developing policies to achieve this objective. Canada's domestic auto industry can be part of the solution, especially if industry policies are designed to enable a transition from the production of some of the least fuel efficient models it currently builds, to the most fuel efficient models it is capable of. But, at less than a 20 per cent share of Canada's market, our domestic producers' contributions are limited at present. Thus, significant improvements in fuel efficiency will be the job of importing automakers as well. This needs to be considered when developing a fuel efficiency standard that reflects Canada's unique situation, and thus maximizes benefits for Canadians, as well as the countries with which we trade.

Benefiting from the adoption of automobile technologies and designs from other markets is certainly not a new concept. The Government of Canada's ecoTECHNOLOGY for Vehicles Program[35] (formerly the Advanced Technology Vehicle Program) conducts research to support the introduction of environmental and efficiency-enhancing technologies from around the world. Under this program, tests have been conducted on several models, including some that appear in Pollution Probe's survey report on highly fuel efficient vehicles (discussed earlier), such as the Smart fortwo cdi, the BMW 320d and a two-door version of the Peugeot 207 1.6 HDi.

Barriers to importing highly fuel efficient vehicles exist, such as the differences in fuel availability and composition between North America and other jurisdictions around the globe, as well as differences in vehicle emissions standards (mainly related to criteria air contaminants). Certain models require specific fuel formulations to function properly, both in terms of general operation and emissions performance. However, these barriers can often be addressed technologically,[36] as evidenced by the presence of the many import models currently available in Canada. Indeed, announcements from importing automakers on their technology plans for compliance with the new, more stringent North American emissions standards (i.e., Tier II and California LEV) are becoming more frequent.

Pollution Probe believes that there are options to align automotive market policy and industry policy so that Canadian consumers can benefit from access to the cleanest, most fuel efficient vehicles made anywhere in the world, and to provide the

[35] Transport Canada ecoTechnology for Vehicles: www.tc.gc.ca/programs/environment/ecotransport/ecotechnologyvehicles.htm. Transport Canada Advanced Technology Vehicles Program: www.tc.gc.ca/Programs/environment/atvpgm/menu.htm.

[36] Ricardo plc (2006). *Fuel Economy Improvement: "Performance without compromise"*, www.ricardo.com/media/globalperspective.aspx

Magna Steyr's 2005 concept "Mila" — A lightweight, high-performance vehicle powered by natural gas and built with high-strength steel and aluminum. With an OEM partner, Magan Steyr says it can bring the concept to a marketable product in 23 months. www.greencarcongress.com/2005/09/magna_steyrs_mi.html

conditions for Canada's auto industry to successfully compete and prosper in the growing global market for fuel efficient vehicles, components and other technologies. Many global component suppliers are already staking out competitive ground by developing expertise in energy storage devices, high-efficiency power transmission devices, advanced emissions controls, lightweight materials, software and electronic precision controls to make it all work.[37] What is Canada's advantage and how can our domestic auto market contribute?

Interestingly, in the September 22, 2007 edition of *The Economist*,[38] *Charlemagne* identifies regulatory standards as a source of global competitiveness. The view is that The European Union has replaced the US as the global regulatory leader, and that its approach is particularly well suited to address issues such as climate change and the environment. According to the article, fast-growing economies, such as China's, are now looking to the EU for regulatory alignment on product design and quality — particularly since global consumer trust may depend on it. Another example is Germany's dominance in solar energy technology. Though not a country one would immediately associate with copious sunshine, Germany's combination of domestic power generation policies, which favour solar above other sources of grid-connected power, and industry policies that support domestic solar technology development and production, have made it a global leader in this fast-growing market. The Hamburg Institute of International Economics and the Berenberg Bank conclude that Germany has become the market leader in many future sectors of the emerging billion-dollar business opportunity that is climate change, including renewable energies, waste management, nano- and bio-technologies and efficiency-boosting technologies.

Pollution Probe believes that good environmental policy is consistent with good industrial and economic policy. Thus, we see no fundamental conflict in addressing environmental issues, such as climate change, in combination with prosperity issues, such as auto industry competitiveness. For example, World Business Chicago identifies the Great Lakes provinces and states as the world's third-largest economic region in the world (after the US and Japan) and one of the

[37] "CO_2 rules drive BorgWarner's growth." *Automotive News Europe* (November 2007). Interview with BorgWarner CEO Timothy Manganello. When asked, "Will you benefit from tougher CO_2 rules?" Manganello replied, "That is what is driving our growth in China, Korea, India and hopefully it will start to help us in North America." BorgWarner is a major international auto components producer headquartered in the US.

[38] *The Economist*, Volume 384 Number 8547. pp. 66.

most diversified. It is also the primary home of the North American auto industry. To invigorate the economy and maximize the wealth-generating potential of the Great Lakes region, The Brookings Institution recommends a comprehensive environmental restoration of the Great Lakes ecosystem as a prerequisite measure.[39]

Therefore, the long-term prospects for the health of Canada's auto industry may depend on the long-term environmental sustainability of the region in which it resides. Pollution Probe argues that increasingly cleaner air and dependable supplies of clean water can be used strategically to attract the best talent to the Great Lakes region. Property and asset values will rise. These are fundamental to innovation and entrepreneurial spirit in the region — key to a globally competitive auto sector. Furthermore, a reliable supply of low-carbon electricity will also help auto industries to reduce GHG emissions associated with their operations and supply chains — a considerable advantage should carbon taxes or CO_2 emissions cap-and-trade regimes be implemented to mitigate climate change.

Canada has an opportunity to implement world-class fuel efficiency standards. We should also consider opportunities to implement policies that will lead to world-class successes in our domestic auto industry.

[39] Austin, Anderson, Courant, Litan (2007). *Healthy Waters, Strong Economy: The Benefits of Restoring the Great Lakes Ecosystem*, The Brookings Institution. www.brookings.edu/metro/pubs/20070904_gleiecosystem.pdf

Concluding Remarks

In this commentary, Pollution Probe presents views on the auto manufacturing industry and consumer automobile markets in the context of the global shift towards more fuel efficient vehicles. The results of our research lead us to challenge the narrow (and yet often prevalent) view of climate change policy. Namely, that fuel consumption standards are simply a hardship that industry must bear and that Canada is limited in its options for setting standards. We view this era of new fuel efficiency and emissions standards implementation around the world as an opportunity to take a fresh look at our options. How should Canada respond to the market and regulatory shifts in the global auto industry and what does our industry need to succeed in that shift?

To answer these questions, Pollution Probe believes it is important to understand our automotive industry and automobile markets, as well as global industry and market trends, so that we can engage in the discussion free of any misconceptions. In this commentary, we have endeavoured to introduce some of the facts and perspectives we believe are important to consider in the development of a world-class fuel consumption standard for Canada, as well as the policies that can provide for a globally successful auto industry.

For Pollution Probe's recommendations on a world-class fuel consumption standard for Canada, please see our submission to the Legislative Committee on Bill C-30.[40]

Further reading on this topic:

- *Automotive Fuel Economy: The Case for Market Failure* — John German and David Greene — www.its.ucdavis.edu/events/outreachevents/asilomar2007/presentations/Day%202%20Session%202/The%20Case%20for%20Market%20Failure%20-%20Asilomar%20Aug07.pdf

- *Automobile Buyer Decisions about Fuel Economy and Fuel Efficiency* — Ken Kurani and Thomas Turrentine — http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1105&context=itsdavis

- *Can Proactive Fuel Economy Strategies Help Automakers Mitigate Fuel-Price Risks?* — Walter McManus — www.osat.umich.edu/research/economic/FuelEconStrat.pdf

[40] Pollution Probe's Comments on Legislation, Regulations and Policies at www.pollutionprobe.org/Reports/Submission%20to%20Legislative%20Committee%20on%20Bill%20C30_6%20Feb%202007_Vehicle%20Fuel%20Efficiency %20Standards.pdf

Pollution Probe reports on vehicle fuel efficiency and greenhouse gas emissions:

- *Greenhouse Gas Emissions And Vehicle Fuel Efficiency Standards For Canada* — www.pollutionprobe.org/Reports/vehiclefuel.pdf

- *Complementary Measures: A Report of the Pollution Probe Workshop to Scope Measures that Promote and Encourage Consumer Demand for More Fuel Efficient Vehicles* — www.pollutionprobe.org/Reports/complementarymeasures.pdf

- *Driving Towards a Cleaner Environment — A Healthier Future* (written in partnership with the Canadian Automobile Association) — www.pollutionprobe.org/Reports/CAA_Driving_Towards%20Nov-01-06.pdf

- *Minutes of the Expert Meeting on Vehicle Fuel Efficiency Standards for Canada* — www.pollutionprobe.org/Reports/Expert%20Meeting%20March%2014%202007.pdf

- *A Global Survey of Highly Fuel Efficient, Low Greenhouse Gas Emitting Vehicles* — www.pollutionprobe.org/Reports/FEvehiclesurvey_Dec2007.pdf

Pollution Probe's comments on legislation, regulations and policies related to vehicle fuel efficiency and greenhouse gas emissions can be found in the *Publications* section of our website under the heading, *Vehicle Fuel Efficiency and Emissions* at www.pollutionprobe.org/Publications/commentpaperssubject.htm.