



# Barriers to Consumer Purchasing of More, Highly Fuel Efficient Vehicles: A Background Paper

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**Pollution Probe** is a non-profit environmental organization that works in partnership with all sectors of society to protect health and the environment by promoting clean air and clean water. Since 2004, Pollution Probe has been conducting in-depth research in technologies and policies to reduce greenhouse gas emissions from light-duty vehicles through improvements in fuel efficiency. Pollution Probe has developed a comprehensive approach that includes fuel efficiency standards for new vehicles sold in Canada complemented with measures to increase consumer demand for fuel-efficient vehicle models.

Pollution Probe's initial publication on this subject, *Greenhouse Gas Emissions and Vehicle Fuel Efficiency Standards for Canada*, was released in February 2005. It incorporates a summary of our research and findings at the time, along with input gathered through an expert review of the draft report, and a major workshop attended by industry and government officials. A second workshop was held in early 2006 on consumer-focused measures to shift market demand to more, highly fuel efficient vehicles. The outcome of this workshop was recognition of the need for effective consumer information tools to promote fuel efficiency as a driver for vehicle purchase and use. This led to a third workshop in early 2008 on scoping systems for identifying and labelling light-duty vehicles according to fuel efficiency and emissions performance. In both the second and third workshops Pollution Probe heard that, while the current education and information programs are important, a better understanding of consumer behaviour with regard to fuel efficient vehicle purchasing was needed to design persuasive programs that achieve significant behavioural change.

This report is part of Pollution Probe's continuing work on motor vehicle fuel efficiency and is specifically aimed at identifying the barriers that inhibit or prevent consumers from purchasing more, highly fuel efficient vehicles. It is a synthesis of research conducted to date on consumer behaviour and will inform Pollution Probe's future research on the use of consumer education, social marketing and regulatory options to draw more fuel efficient vehicles into the Canadian market in response to robust consumer demand.

Pollution Probe thanks the Office of Energy Efficiency (OEE) of Natural Resources Canada (NRCan), the Government of Ontario Ministry of Transportation (MTO) and Ministry of Environment (MOE), and the Canadian Automobile Association — South Central Ontario (CAASCO) for their support of this work, making possible the production of this report.

This study:

- Examines the continuum of interventions to promote behaviour change;
- Summarizes psychographic and demographic research on vehicle consumer segmentation;
- Identifies segments that are more likely to change their behaviour than others;
- Summarizes research on specific barriers to the purchase of fuel-efficient vehicles;
- Considers potential barriers to the purchase of fuel-efficient vehicles which have not received substantive study; and
- Suggests avenues for further research on consumer segmentation and the barriers that must be overcome to increase consumer demand for more, highly fuel-efficient vehicles.

The benefits of this work will be to provide our partners, as well as other stakeholders, a better understanding of specific barriers they should address to produce more successful campaigns to promote demand for fuel efficient vehicles.

# Table of Contents

<b>1. Overview</b>	<b>1</b>
<b>2. Behavioural Change Interventions</b>	<b>3</b>
2.1 <i>Intervention Mechanisms</i>	3
2.1.1 <i>Continuum of Interventions</i>	3
2.1.2 <i>Intervention Map</i>	4
2.2 <i>Interventions</i>	4
2.2.1 <i>Law and Regulation</i>	4
2.2.2 <i>Education</i>	6
2.2.3 <i>Social Marketing</i>	7
2.3 <i>Methodology for Planning Behaviour Change Campaigns</i>	8
2.3.1 <i>Audience Selection</i>	8
2.3.2 <i>Barriers, Benefits and Social Norms</i>	9
2.3.3 <i>Objective Types</i>	9
2.3.4 <i>Marketing Principles</i>	9
<b>3. Segmentation of Vehicle Drivers and Owners</b>	<b>11</b>
3.1 <i>Segmentation Strategies</i>	11
3.2 <i>Segments likely to adopt the Preferred Purchasing Behaviour</i>	12
3.2.1 <i>Natural Resources Canada Research</i>	12
3.3 <i>Segments unlikely to adopt the Preferred Purchasing Behaviour</i>	15
3.3.1 <i>Natural Resources Canada Research</i>	15
3.4 <i>Hybrid Early Adopters</i>	17
3.4.1 <i>Institute of Transportation Studies (UC Davis) Hybrid Owner Research</i>	17
3.4.2 <i>Toyota's Hybrid Owner Psychographic Segmentation</i>	18
3.4.3 <i>Hybrid Segment Summary</i>	18
<b>4. Barriers to the Purchase of Fuel Efficient Vehicles</b>	<b>19</b>
4.1 <i>Potential Barriers to Motivation</i>	19
4.1.1 <i>Knowledge Barriers</i>	19
4.1.2 <i>Belief Barriers</i>	20
4.2 <i>Potential Barriers to Action</i>	22
<b>5. Summary</b>	<b>24</b>

# 1. Overview

Motor vehicles are a source of three main types of emissions that have serious environmental, economic and social implications for Canadians — smog precursors, air toxics and greenhouse gas emissions. The transportation sector represents approximately one-quarter of Canada's greenhouse gas (GHG) emissions, half of which are from light-duty vehicles.<sup>1</sup> Motor vehicles are also a major source of smog precursor and air toxic emissions at the local level. The Toronto Department of Public Health estimates that motor vehicles are the largest source of carbon monoxide (85 per cent) and nitrogen oxides (69 per cent) emissions in Toronto, and a significant source of fine particulates (PM2.5: 16 per cent) and air toxics.<sup>2</sup>

In order to make the significant progress needed to address critical climate change and air quality issues, it is essential to deal with increasing emissions from the personal vehicle fleet. Pollution control technology, fuel switching and vehicle use all have roles to play in reducing air pollutants and GHG emissions. However, one of the most effective ways to reduce GHG emissions is to improve the overall fuel efficiency level of the vehicle fleet, which can also help reduce emissions of other air pollutants.

To ensure that there is continuous improvement in the fuel efficiency of new vehicles, the Government of Canada passed legislation in 2007 to regulate new vehicle fuel consumption levels (i.e., the *Motor Vehicle Fuel Consumption Standards Act*). Regulated standards are under development for model years 2011 and beyond. However, simply setting a fuel efficiency standard is not enough, according to the 2008 *King Review*<sup>3</sup> of low-carbon cars in the United Kingdom. The review identified that strong regulations on fuel efficiency need to be coupled with strong marketing or incentive campaigns, or else consumers may not respond to the product offerings that manufacturers are obliged to make via regulation.

Historically, however, consumers have shown little interest in fuel efficiency when buying new vehicles, resulting in little incentive for automakers to supply the market with more, highly fuel efficient vehicles. Hence, fleet-average fuel efficiency levels in new vehicles have not substantially improved in more than 20 years. The missed opportunities for improvement have contributed to increasing GHG emissions (as vehicle use increased) and also to a loss of potential fuel savings for consumers and to degraded air quality.

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<sup>1</sup> Environment Canada. 2007. *National Inventory Report 1990–2004: Greenhouse Gas Sources and Sinks in Canada*.

<sup>2</sup> McKeown. 2007. *Air Pollution Burden of Illness from Traffic in Toronto Problems and Solutions*. Toronto Public Health

<sup>3</sup> King, J. 2008. *The King Review of Low-carbon Cars*.

On the other hand, recent surveys are showing that, in general, Canadians are beginning to develop an interest in vehicles that are more fuel-efficient.<sup>4</sup> The surveys also indicate that fuel efficiency performance will be an important factor in new purchase decisions.<sup>5</sup> This presents an opportunity to increase overall consumer demand for highly fuel-efficient vehicles, provided effective measures are implemented to support and promote this trend.

Developing effective incentive measures first requires that the barriers preventing consumers from purchasing more, highly fuel efficient vehicles are identified and reduced. For some consumers the barriers may be structural; for others, the barriers could be perceptions about fuel efficiency. Mitigating or eliminating these barriers can help develop strong and sustained market demand for highly fuel efficient vehicles, technologies and designs.

*Note that this discussion is focused on factors relating to the new vehicle consumer and the point-of-purchase — not factors relating to driver behaviour and vehicle maintenance after a purchase has been made.*

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<sup>4</sup> Redfern. 2005. *Public Views on Vehicle Emissions Standards*. Leger Marketing.

<sup>5</sup> Harris Interactive. 2004. AUTOTECHCAST Study.

## 2. Behavioural Change Interventions

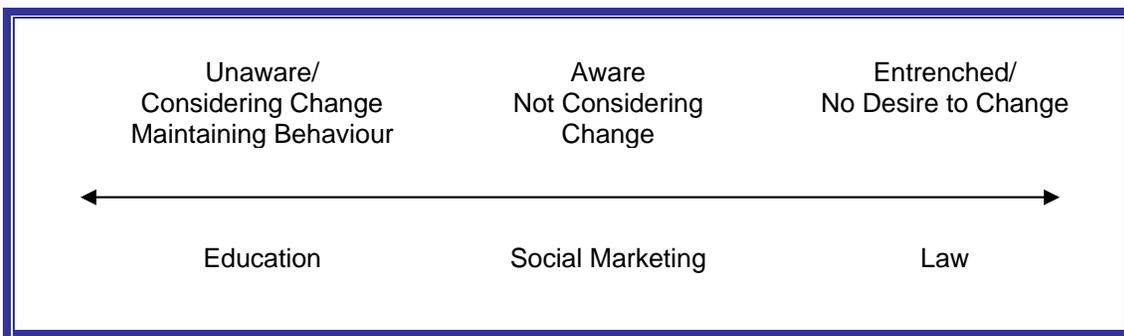
### 2.1 Intervention Mechanisms

When faced with the need for society-wide behavioural change for societal good (i.e., public health and safety or environmental protection), there are three methods that can be employed: education, social marketing and law.<sup>6</sup> The key roles of these methods, respectively, are to raise awareness, to enhance the desirability of the behaviour change to the consumer, and to heighten the consequences of alternative behaviours.

#### 2.1.1 Continuum of Interventions

Education, social marketing and law define a “continuum of interventions” to address barriers to change (see Figure 1). To be effective, the intervention measures must be matched to the requirements of the target audiences and often work best in combination. For example, education programs may raise public awareness about fuel efficiency, but this may not necessarily lead to increased consumer demand for fuel efficient vehicles. In addition, while laws and regulations can mandate the supply of fuel efficient vehicles, they do not directly mandate what consumers prefer to buy. Some social marketing campaigns may not target the correct barriers or audiences and therefore may not achieve significant progress.

Figure 1



In order to bring about serious change as quickly as possible, a comprehensive approach is needed that builds on past experience, identifies specific target audiences and the barriers they face, and offers a combination of approaches that can be used to effectively grow consumer demand for more, highly fuel efficient vehicle models.<sup>7</sup>

<sup>6</sup> Social Marketing National Excellence Collaborative. 2003  
[http://www.turningpointprogram.org/Pages/pdfs/social\\_market/smc\\_basics.pdf](http://www.turningpointprogram.org/Pages/pdfs/social_market/smc_basics.pdf)

<sup>7</sup> Rothschild. 1999. *A Conceptual Framework for the Management of Public Health and Social Issue Behaviors*. Journal of Marketing. Vol. 63, 24-37.

### 2.1.2 Intervention Map

While the *continuum of interventions* illustrates that there are a range of situations with which the applications must deal, it does not identify the specific situations which require a combination of two or three of the interventions at once. Rothschild's *map of applications* (see Figure 2) goes beyond the continuum to illustrate the audience characteristics and scenarios that require specific combinations of applications. The presence, or lack, of the three main components determines the necessary mix of interventions to initiate social change.

Figure 2

Motivation		Yes		No	
Opportunity	Yes	No	Yes	No	
Ability	Prone to behave	Unable to behave	Resistant to behave	Resistant to behave	
Yes	<i>Education</i>	<i>Marketing</i>	<i>Law</i>	<i>Marketing, law</i>	
No	Unable to behave <i>Education, marketing</i>	Unable to behave <i>Education, marketing</i>	Resistant to behave <i>Education, marketing, law</i>	Resistant to behave <i>Education, marketing law</i>	

Source: Rothschild. 1999.

Motivation, opportunity and ability (MOA) to enact behaviour change vary widely among individuals.<sup>8</sup> Recognizing this, it is necessary to *segment audiences* into groups which can be specifically analyzed for MOA and properly targeted by the combination of education, marketing and law.

## 2.2 Interventions

### 2.2.1 Law and Regulation

Laws and regulations can act to lessen the perceived advantages of old behaviours as well as the perceived sacrifices of new ones when campaigning for social behavioural change.<sup>9</sup> The use of law is an extrinsic activator for unmotivated yet aware individuals.

In some forms of behavioural change, law can act to limit the audiences' or consumers' freedom of choice. For example, regulating the age for cigarette purchase was intended to limit the access teenagers had to smoking. In other forms of behavioural change however, law may have little effect on the level of choice for consumers.

<sup>8</sup> McKenzie-Mohr and Smith. 1999. *Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing*. New Society Publishers.

<sup>9</sup> Rothschild. 1999. *A Conceptual Framework for the Management of Public Health and Social Issue Behaviors*. Journal of Marketing. Vol. 63, 24-37.

Due to the variety of impacts law and regulations can have, it is important to know what the barrier to change is; is it that consumers are unwilling to change, or are they simply limited by their options?

***Assumption: Given the increased options for fuel-efficient vehicles in countries with fuel efficiency regulations compared to countries without such regulations,<sup>10</sup> a law intervention appears to increase rather than limit consumer choice with regards to fuel efficiency.***

## Use of Law to Increase Vehicle Fuel Efficiency

Regulation has been used to reduce fuel consumption levels in new vehicle fleets. Concerns about the negative economic impacts of the United States' dependency on foreign oil imports, punctuated by the oil embargos of the 1970s, motivated the US Congress to mandate improvements in new automobile fuel economy levels. Legislation was passed that set *Corporate Average Fuel Economy* (CAFE) standards, which required an approximate doubling of new passenger car fuel economy levels by 1985 compared to pre-1975 levels.

CAFE standards were successful at dramatically reducing oil consumption in the United States throughout the 1980s and 1990s. Despite continuing increases in the overall vehicle population and use, total gasoline consumption in the United States (and Canada) remained lower than the late-1970s peak for most of this time period. However, no significant increases in overall fuel economy standards were required by regulation since the late-1980s, and as of 2007, new vehicle fuel economy levels in the United States (and Canada) were no higher than they were 20 years earlier.<sup>11</sup> During this time, automobile technologies and design improvements that could have been applied to improve overall fuel economy levels, were instead generally used to support increases in horsepower, acceleration performance and vehicle mass.<sup>12</sup>

In late-2007, after years of debate, the US Congress has again mandated an increase in fuel economy levels (the first time since 1975, when Congress passed the *Energy Policy and Conservation Act*). The *Energy Independence and Security Act* of 2007 requires federal regulators to develop and implement new CAFE standards that will raise the average fuel economy of the fleet in the United States to *at minimum* 35 mpg. As noted in the overview, the Government of Canada is currently regulating fuel consumption standards for Canada, as legislated by the *Motor Vehicle Fuel Consumption Standards Act* proclaimed in 2007.

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<sup>10</sup> Millikin and Arlotto. 2007. *A Global Survey of Highly Fuel Efficient, Low Greenhouse Gas Emitting Vehicles*. Pollution Probe

<sup>11</sup> Oliver. 2005. *Greenhouse Gas Emissions and Vehicle Fuel Efficiency Standards for Canada*. Pollution Probe.

<sup>12</sup> Oliver. 2005. *Greenhouse Gas Emissions and Vehicle Fuel Efficiency Standards for Canada*. Pollution Probe.

### 2.2.2 Education

Public education is intended to raise public awareness of an issue. It is used to introduce audiences to new or complicated information. Educating an audience requires a statement or explanation of the facts (i.e., smoking increases your chances of cancer), but it is rarely effective in stimulating behaviour change on its own.<sup>13</sup> Education is especially unsuccessful when the activity or behaviour that is being targeted has perceived benefits over the recommended action<sup>14</sup> (i.e., smoking is “cooler” than not).

Education is a means of assessing and discussing audiences’ needs, as well as of motivating behavioural change without providing a direct reward or consequence.<sup>15</sup>

***Assumption: Education and raising awareness of the environmental impacts of vehicle fuel consumption may not be successful in increasing broad consumer demand for fuel-efficient vehicles since other behaviours (such as preference for higher horsepower and larger size) may have perceived benefits. In addition to education, the benefits of powerful vehicles should be challenged while the benefits of efficient vehicles are explained.***

#### Education for Personal Action to Increase Vehicle Fuel Efficiency

In the context of vehicle fuel efficiency and emissions, public education campaigns encourage individuals to reduce their emissions by changing either their purchasing or driving behaviour. These campaigns are focused on raising awareness among consumers of the consequences of personal vehicle use and providing motivation for individuals to make changes that conserve fuel and reduce emissions.

Canada currently has multiple public education campaigns underway to raise awareness about vehicle fuel consumption as well as fuel conserving driving behaviours. The following describes some of the leading programs.

*EnerGuide Label* — New vehicles on dealer lots have labels attached voluntarily by manufacturers which show the fuel consumption and estimated fuel costs of the vehicle.<sup>16</sup> This enables consumers to compare the fuel efficiency performance and economic costs of the vehicles they are considering purchasing. Fuel consumption guides are also produced and distributed, listing the fuel consumption ratings of all new personal vehicles for the new model year.

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<sup>13</sup> Rothschild. 1999. *A Conceptual Framework for the Management of Public Health and Social Issue Behaviors*. Journal of Marketing. Vol. 63, 24-37.

<sup>14</sup> Mintz. 2005. *Social Marketing in Health Promotion...the Canadian Experience*. Presentation at Pollution Probe Complimentary Measures Conference in Toronto.

<sup>15</sup> Rothschild. 1999. *A Conceptual Framework for the Management of Public Health and Social Issue Behaviors*. Journal of Marketing. Vol. 63, 24-37.

<sup>16</sup> For more information visit:

<http://www.oee.nrcan.gc.ca/transportation/personal/buying/energuide-label.cfm?attr=8>

*NRCan's Personal Transportation* — Information materials and packages are developed to promote fuel-efficient, environmentally-responsible driving behaviour and vehicle purchasing decisions.<sup>17</sup> Various products include the Auto\$mart Student Driving Kit, a Fuel Consumption Guide, the Fuel Economy Calculator, a 1-800 line and a web site.

*Autogreen*<sup>18</sup> — The Canadian Automobile Association South Central Ontario (CAASCO) runs an annual campaign to educate and encourage its members to practice driving and vehicle maintenance techniques that minimize the environmental impact of automobile use. The campaign promotes the benefits of “eco-driving” and offers related events and contests in which their members can take part.

### ***2.2.3 Social Marketing***

Social marketing is “a process for influencing human behaviour on a large scale, using marketing principles for the purpose of societal benefit rather than commercial profit.”<sup>19</sup> Social marketing aims to influence and develop new behaviours, as well as encourage new values.<sup>20</sup> Environmental social marketing seeks to encourage pro-environmental behaviours and choices, as well as to increase the societal value of environmental and health concerns so that it outweighs currently held countervailing values.

***Assumption: In the context of vehicle fuel efficiency, environmental social marketing aims to promote the values of lower fuel consumption and vehicle emissions over the broadly-held values of greater horsepower or size.***

### **Social Marketing and Fuel Efficiency**

The challenge of using social marketing to promote fuel efficiency is that audiences who change their behaviour will not see a direct benefit with regards to climate change and air quality unless society changes as a whole. Therefore, it may be considered preferable for social marketers to focus on the moral or financial benefits of fuel efficient, low-emissions transportation, rather than focusing on the overall environmental benefits, which may not be apparent to individual practitioners. On the other hand, studies have indicated that the financial benefits of fuel savings may not be sufficient to appeal to motorists.

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<sup>17</sup> For more information visit:

<http://www.oee.nrcan.gc.ca/transportation/business/driver-educators.cfm?attr=8>

<sup>18</sup> [www.caasco.com/advocacy/gov\\_affairs/autogreen.jsp](http://www.caasco.com/advocacy/gov_affairs/autogreen.jsp)

<sup>19</sup> Social Marketing National Excellence Collaborative. 2003.

[http://www.turningpointprogram.org/Pages/pdfs/social\\_market/smc\\_basics.pdf](http://www.turningpointprogram.org/Pages/pdfs/social_market/smc_basics.pdf)

<sup>20</sup> Kurani and Turrentine. 2002. *Marketing Clean and Efficient Vehicles: A Review of Social Marketing and Social Science Approaches*. Institute of Transportation Studies, University of California, Davis, Research Report.

## ***2.3 Methodology for Planning Behaviour Change Campaigns***

The Canadian Centre of Excellence for Public Sector Marketing (CEPSM) has laid out a plan for program developers to follow when attempting to promote behavioural change. The following section is adapted from their workbook and presentation.

CEPSM identified six stages or steps of behavioural change that individuals may exhibit:

- **Pre-Contemplation:** No intention to change behaviour; in denial or uninformed of the need to change;
- **Contemplation:** Acknowledge problem and begin to think about change;
- **Preparation:** Plan to take action and make adjustments within the next month;
- **Action:** Modify behaviour and surroundings to facilitate change;
- **Maintenance:** Work to consolidate the gains attained during action phase; struggle to prevent lapses and relapse;
- **Termination:** New behaviour is fully adopted.

Depending on the audience's stage of change, communications and education can play a significant role in raising awareness and initiating behaviour change. As a result, education and strategic communications are appropriate for individuals in the pre-contemplation, contemplation or preparation stages whereas social marketing is appropriate for individuals in the action, maintenance and termination stages.

### ***2.3.1 Audience Selection***

Since interventions can address specific groups of individuals (i.e., education for contemplation and social marketing for action) it is necessary to segment communities or audiences into groups that can be targeted by specific interventions. CEPSM cautions that the selection of target groups needs to be well thought out. When selecting audiences, the TARPARE method takes six features of each group into account before determining the group most likely to change their behaviour:

- **Total number of people in the segment:** segments with more individuals are preferred;
- **At Risk:** segments at higher levels of risk should be given priority;
- **Persuadability:** segments which are easily persuaded should be given priority. The low hanging fruit will require fewer resources to change their behaviour;
- **Accessibility:** target audiences that are easier to reach with messages should be given priority as less work and fewer resources will be needed to make an impact;
- **Resources required:** the fewer required resources, the greater the expected return on investment;
- **Equity:** disadvantaged segments should be given priority.

In short, selecting a target group or market involves four themes: those with the greatest need for change; those most ready to change; those easiest to reach and respond; and those who are the best strategic fit with the organization.

### *2.3.2 Barriers, Benefits and Social Norms*

When developing a behavioural change campaign, there is a need to recognize and understand the competing behaviours and barriers to the audience adopting the promoted behaviour. Once identified, programs should remove barriers and enhance benefits to encourage individuals to respond positively. Social norms should also be considered as a means of encouraging behavioural change. When individuals realize that a behavioural change is acceptable or expected in a situation, they may be more likely to do this to appear socially acceptable.

### *2.3.3 Objective Types*

There are three types of objectives which behavioural change campaigns might have for their target audience:

- **Behaviour Objectives:** simple, clear and achievable actions that individuals can make;
- **Knowledge Objectives:** benefits of the proposed behavioural change and tools available to help undertake the change which individuals within the target group should know and understand; and
- **Belief Objectives:** the target group should believe that they are capable of performing the desired behaviour and that it will produce the desired results. In some cases, the target group should also believe that there is a consequence to their current behaviour.

### *2.3.4 Marketing Principles*

Marketing traditionally incorporates four principles: Product, Price, Place and Promotion. Communication campaigns often only focus on promotion, but an effective social marketing campaign should include all four:

- **Product:** There are three types of products
  - The **Actual product** is the specific behaviour which is being promoted (i.e. buying a more fuel efficient vehicle);
  - The **Augmented product** is the array of objects and services that support the behaviour change (i.e. a fuel efficiency website); and
  - The **Core product** is the benefit the individual will experience when they perform the behaviour (i.e. save money, protect the environment).

- **Price:** The monetary and non-monetary cost that is associated with adopting the new behaviour. This includes the cost of giving up the old behaviour and taking up the new one. In order for individuals to adopt a new behaviour, the benefits must be equal to or greater than the costs.
  - *Potential non-monetary costs for fuel efficiency:* Time required to understand fuel efficiency ranking systems and to compare values; the perception that changing to a more fuel efficient model may place personal safety at risk; the possible physical discomfort of choosing a smaller, more fuel efficient vehicle; the perception of lost value from choosing vehicle with decreased engine power.
- **Place:** The location where the target group will both perform the desired behaviour and encounter objects and services to facilitate the desired behaviour.
- **Promotion:** Strategic communication ensures that the target group knows about the behavioural change, believes they will experience the benefits, and are inspired to act.

### 3. Segmentation of Vehicle Drivers and Owners

Segmenting vehicle owners and drivers will accomplish two objectives within this project. The first objective will be to identify groups of individuals who are likely to adopt the preferred vehicle purchasing behaviour and those who are unlikely to change. By doing this, future campaigns can target the low hanging fruit and accomplish the most behavioural change using the least amount of resources possible. The second objective is to compare owners of highly fuel efficient vehicles to owners of inefficient vehicles to determine the factors that drive or prevent the purchase of fuel efficient vehicles.

*Objective #1: to target individuals most likely to change behaviour*

*Objective #2: to identify benefits and barriers to the promoted behaviour by comparing early adopters to others.*

#### 3.1 Segmentation Strategies

Segmentation of audiences or consumers can take place using quite different strategies depending on the measured variables. Most research on consumer behaviour and fuel efficient vehicle purchase use psychographic and/or demographic segmentation.

**Demographic Segmentation:** a system for segmenting individuals into groups based on socioeconomic factors such as age, income, gender, urban/suburban/rural, occupation, education, religion, etc. Demographic segmentation is often used because the defining variables are easy to measure and often, consumer wants and needs match the demographic grouping they exist in.<sup>21</sup>

**Psychographic Segmentation:** a system for segmenting individuals into groups based on lifestyle factors such as attitudes, beliefs, values, opinions, hopes, fears, social norms, personality, etc. The variables for psychographic segmentation are more difficult to identify, and require interviews and focus groups to identify.<sup>22</sup>

The following sections will summarize research on audience segmentation for fuel efficient vehicle purchasing and will separate those segments likely to change their purchasing behaviour from those who are unlikely to change. The final section will identify characteristics typical of early hybrid adopters in attempts to highlight traits which make an individual more likely to change their behaviour, and also identify the benefits of fuel efficient vehicle purchasing that may be enhanced to appeal to larger groups of individuals.

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<sup>21</sup> Mintz. 2008. *Social Marketing*. Centre of Excellence for Public Sector Marketing Presentation.

<sup>22</sup> Ibid.

### 3.2 Segments likely to adopt the Preferred Purchasing Behaviour

In depth Canadian research has been conducted on the segmentation of vehicle owners and consumers into groups with regards to their attitudes towards fuel economy and their propensity to alter their behaviour in their vehicle purchasing decision. This research will be summarized in the following section. This section will introduce research from California which identifies target groups that are not dealt with in the Canadian research.

Research conducted by Kurani and Turrentine has indicated that programs intending to alter vehicle purchasing behaviour would be most effective if they targeted audiences at a point of change in their lives (e.g., students buying a first car, parents having a second baby, or couples becoming empty nesters). As programs are developed for changing vehicle purchasing behaviour, it may be interesting to target individuals at a vehicle transition point in their lives within segments open to changing their behaviour.

Kurani and Turrentine also segmented the vehicle owners they surveyed into six groups. While they did not identify those most likely to adopt the preferred purchasing behaviour, they are displayed here to demonstrate segmentation and possible barriers which may be of interest later.

Profile	Description
<b>Threshold Thinkers</b>	Have a minimum expectation of their vehicles' efficiency. Over time this threshold usually decreases as the consumer compromises efficiency for space, size or power requirements.
<b>The Middle Road</b>	Avoid the largest gas guzzlers but believe they need something big with lots of seats. They believe that it is safer.
<b>Cost Not a Factor</b>	Want big engine, luxury, style and image. Would choose a particular brand because of how it looks.
<b>Brand Choosers</b>	Loyal to a particular brand. Believe that their brand is efficient and better than other vehicles within their class.
<b>The Poor</b>	Buy used cars. Gasoline is budgeted or paid out-of-pocket so very unlikely to know annual fuel costs.
<b>Old Habits</b>	Grew up through hard times, raised poor. May shop for cheap fuel but will buy a powerful car.

Source: Kurani and Turrentine. 2007.

There was one further group which was identified through Kurani and Turrentine's research — early hybrid vehicle adopters. This group's psychographic and demographic segmentation will be summarized later.

#### 3.2.1 Natural Resources Canada Research

In order to inform its own programs on increasing consumer demand for highly fuel efficient vehicles, Natural Resources Canada has conducted psychographic and demographic research to segment vehicle owners into groups sharing similar attitudes

towards fuel economy and likely propensity to buy highly fuel efficient vehicles. Research conducted by Kindra in 2004 initially segmented drivers demographically based on their environmental ideology. Drivers who had strong environmental beliefs were segmented into three groups: *activists*, *boosters* and *the anxious*.<sup>23</sup>

Ideology	Profile	Description
<b>Environmental Greens</b> <ul style="list-style-type: none"> <li>• Environment is an important issue.</li> <li>• Understand global warming and climate change.</li> <li>• Understand Kyoto</li> <li>• Understand the causes and consequences of fuel inefficiency</li> <li>• Feel responsible.</li> </ul>	<b>Activists</b>	Young, well educated, empowered, less trusting of government and business, opinion leaders, less susceptible to mass media. Approximately 20 per cent of the population
	<b>Boosters</b>	Optimistic, exemplary behaviour, trust business, government, technology, growth segment; empowered, mass media friendly. Approximately 17 per cent of the population
	<b>The Anxious</b>	Scared and guilt-ridden, helpless, no empowerment, highly supportive of government action, least likely to 'act'. Approximately 18 per cent of the population.

Source: Kindra. 2004.

These demographic segments were analysed with psychographic segments in order to better understand drivers and enable campaigners to specifically target groups using the least amount of resources. Kindra identified three psychographic groups who were most likely to adopt fuel efficient vehicles, and these groups with their matching demographic segments are profiled in the following table.

Profile	Description
<b>Hard-Core Supporters (HCS)</b>  ~5 per cent of Population: Boosters and Activists	<ul style="list-style-type: none"> <li>• Care deeply about the environment,</li> <li>• Attempt to keep their consumption environmentally friendly</li> <li>• Environment activists and outspokenly green</li> <li>• Will purchase a fuel efficient car because it's better for the environment.</li> </ul>
<b>Environmentally Friendly</b>  ~30 per cent of Population: Boosters and Activists	<ul style="list-style-type: none"> <li>• Not as overt as HCS, but do have environmentally friendly behaviour</li> <li>• Concerned about issues of pollution and air quality</li> <li>• Do not actively promote the environment, but do their part where they can</li> <li>• Need to be convinced that a fuel efficient car has benefits to them, although it wouldn't be a tough sell if the price is right.</li> </ul>
<b>Value Seekers</b>  ~35 per cent of Population: Apathetics, Fatalistics and the Anxious	<ul style="list-style-type: none"> <li>• Make vehicle purchases strictly on value.</li> <li>• Fuel consumption is treated as is any attribute and needs to be demonstrated to have value in terms of cost-benefit.</li> <li>• Individual cost-benefit is more effective than benefit to society overall.</li> </ul>

Source: Kindra. 2004.

<sup>23</sup> Kindra. 2004. *Consumer Behavior Report: Framework for a Vehicular Fuel Efficiency Marketing Program at NRCAN*. CMRDI Inc.

The *Hard Core Supporters* and the *Environmentally Friendly* psychographic groups were identified as the primary target groups for projects encouraging behavioural change within the vehicle purchasing decision process. *Value-Seekers* were identified as the secondary target group as these people were less likely to change their behaviour.

Further market research conducted by NRCan and Environics in 2005 identified four segments of car owners/purchasers, two of which were recognized as most concerned about the environmental performance of their vehicle and therefore the most likely to change their behaviour within the vehicle purchasing decision: *Enlightened Adopter* and *Confused Seeker*, as described in the table below.

	<b>Enlightened Adopter</b>	<b>Confused Seeker</b>
<b>Descriptor</b>	<ul style="list-style-type: none"> <li>• Concerned and informed (not necessarily looking for more information).</li> <li>• Believe their and others' choices make an impact</li> <li>• Resent larger gas guzzling vehicles.</li> <li>• Put highest importance on fuel economy; driving needs are flexible.</li> <li>• Drive import subcompacts, compacts, and compact SUVs.</li> </ul>	<ul style="list-style-type: none"> <li>• Concerned and open to information</li> <li>• Believe that there is little that any individual can do and that government should take the lead.</li> <li>• Resents larger gas guzzlers and are afraid of their size.</li> <li>• Believe that most cars of the same class get the same fuel economy.</li> <li>• Want information but find it hard to get.</li> </ul>
<b>Demographics</b>	<ul style="list-style-type: none"> <li>• More women than men</li> <li>• More francophones</li> <li>• Younger than average Canadian.</li> <li>• Single</li> <li>• Better educated</li> <li>• Upper-mid incomes</li> <li>• Most commonly in Ontario, Quebec or British Columbia.</li> <li>• Most commonly in urban centres</li> </ul>	<ul style="list-style-type: none"> <li>• Mother tongue not French or English</li> <li>• Older than average Canadian</li> <li>• Lower education</li> <li>• Retired</li> <li>• Lower income</li> <li>• Most commonly smaller households without children.</li> </ul>
<b>Purchasing Factors</b>	<ul style="list-style-type: none"> <li>• More likely to consider elements related to the size of the vehicle and its fuel consumption and environmental issues (emissions) and less likely to consider power and performance</li> </ul>	<ul style="list-style-type: none"> <li>• Anxious about safety — have already bought a smaller car than they want and don't want to go smaller.</li> <li>• Want proven technology.</li> </ul>
<b>Trusted Sources</b>	<ul style="list-style-type: none"> <li>• Anecdotal information about fuel efficiency and environmental impacts of the vehicle.</li> <li>• Anecdotal information about status and fashion.</li> <li>• Consumer reports magazines</li> <li>• Newspapers</li> <li>• Consumer or car-related magazine</li> <li>• Internet</li> <li>• Gas mileage performance from Industry Canada</li> <li>• Manufacturer's marketing position/cross check against other information and ratings.</li> <li>• Crash testing information.</li> </ul>	<p><b>Want all the information they can get from as many sources as possible.</b></p> <ul style="list-style-type: none"> <li>• Anecdotal information from friends and family.</li> <li>• Often impulse buy and tend to have spontaneous attractions to cars.</li> <li>• Magazines</li> <li>• Consumer television programs</li> <li>• Consumer comparisons online and in print</li> <li>• Dealerships</li> <li>• Trust level is not high for any specific source other than anecdotal word of mouth information.</li> </ul>

Source: Environics Research Group. 2005.

### 3.3 Segments unlikely to adopt the Preferred Purchasing Behaviour

Depending on people’s attitudes towards vehicle fuel efficiency, towards their personal contribution to environmental problems, and towards their vehicle use, certain people will be less likely to voluntarily change their vehicle purchasing behaviour. As discussed earlier, these individuals may require the presence of regulations to guide them towards more fuel efficient vehicles and, as a result, they would be the secondary target in a behavioural change campaign. However, once the segments that are likely to change are successfully targeted by campaigns, the secondary segments may become the primary targets. These segments are dealt with in this section.

#### 3.3.1 Natural Resources Canada Research

The same research conducted by Kindra in 2004 that identified three demographic segments most likely to adopt highly fuel efficient vehicles, as discussed in the previous section, also identified three groups unlikely to change their vehicle purchasing behaviour: *Apathetic Mainstreamers*, *Fatalistic Bystanders*, and *the Hostile*.

Ideology	Profile	Description
<b>Environmental Cynics</b> <ul style="list-style-type: none"> <li>• Environment is not a priority.</li> <li>• Not familiar with the issues.</li> <li>• Have little interest in changing their behaviour.</li> <li>• Do not connect individual behaviour with social consequence.</li> <li>• It’s not their problem.</li> </ul>	<b>Apathetic Mainstreamers</b>	Older, less educated, small city-rural, neither alienated nor harmonious, concerned, but not alarmed.  Approximately 18 per cent of the population
	<b>Fatalistic Bystanders</b>	Depressed, low education and incomes, self centred, survivalists.  Approximately 14 per cent of the population
	<b>The Hostile</b>	Primarily middle-aged, prosperous, conservative, deny problem, see leftist conspiracy, counter-argue and ignore messages.  Approximately 13 per cent of the population

Source: Kindra, 2004

Again Kindra matched demographic segments with psychographic segments to best understand drivers. Two psychographic groups were identified who were unlikely to adopt fuel efficient vehicles. These groups, with their matching demographic segments, are profiled in the following table.

Profile	Description
<b>Experiential Buyers (EB)</b>  ~20 per cent of Population: Apathetics, Fatalistics and the Anxious	<ul style="list-style-type: none"> <li>• Purchase vehicles for the feel and experience of driving.</li> <li>• They focus on the price for the reputation, design and vehicle performance they want.</li> <li>• Specific vehicle attributes are secondary to those mentioned above.</li> <li>• Not against fuel efficiency as a concept, but do not consider environmental issues while considering vehicle purchase.</li> </ul>
<b>Hard-Core Critics (HCC)</b>  ~10 per cent of Population: The Hostiles	<ul style="list-style-type: none"> <li>• Are obvious in their disregard for the environment.</li> <li>• Do not consider or care about their impact on the environment.</li> <li>• Believe that vehicles are for consumption and personal pleasure</li> <li>• Fuel consumption is strictly a cost consideration</li> <li>• Mention of the environment is apt to generate backlash.</li> </ul>

Source: Kindra. 2004.

NRCan identified the *Hard Core Supporters* and the *Environmentally Friendly* segments as the primary targets for their behavioural change campaigns. The *Value Seekers* segment was considered a secondary target. The *Experiential Buyers* and the *Hard Core Critics* could also be considered a secondary target for the campaign addressing *Hard Core Supporters* and *Environmentally Friendly* segments.

While some of the environmental cynics may be swayed by messaging directed towards the *Environmental Greens* (see previous section), many individuals will likely be resistant to any messaging or program whose message is environmental improvement. As a result, alternative programming will likely be necessary to address the segments that are generally classified as being *Environmental Cynics*.

The NRCan and Environics research from 2005, which identified segments of car owners/purchasers, also identified groups that were unconcerned with the environmental impact of their vehicle, and as a result may be resistant to messaging designed to change their vehicle purchasing behaviour: *Passive Receptives* and *Unapologetic Drivers*, as described in the table below.

	Passive Receptives	Unapologetic Drivers
<b>Descriptor</b>	<ul style="list-style-type: none"> <li>• Environmental impact not concerning but interested in information on fuel efficient driving.</li> <li>• Believe that individuals have some control over their environmental impacts, but don't think about it that much.</li> <li>• Do not begrudge others vehicle choices.</li> <li>• Believes that it is difficult to find information to compare vehicles and behaviours.</li> <li>• Own slightly older vehicles, bought used, more mid-size, large and SUV vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>• Unconcerned and knowledgeable (not seeking information).</li> <li>• Believe that emissions from personal vehicles have little impact on the environment and think there is little anyone can do.</li> <li>• The cost of fuel is not important</li> <li>• Refuse to compromise driving desires for efficiency/emissions.</li> <li>• Do not resent large vehicles or wasteful driving behaviour.</li> <li>• Think it is easy to find information, but do not personally want any.</li> <li>• Sceptical of government involvement in minimizing environmental impact of vehicle use.</li> </ul>

...continued		
<b>Demographics</b>	<ul style="list-style-type: none"> <li>• Slightly more women than men</li> <li>• Slightly more native Anglophones</li> <li>• Younger than Canadian average</li> <li>• Single</li> <li>• More with children than average</li> <li>• Fewer post-grads</li> <li>• Slightly lower income</li> <li>• Likely to be working or looking for work</li> </ul>	<ul style="list-style-type: none"> <li>• More men than women</li> <li>• Average age</li> <li>• More Anglophones</li> <li>• Higher income</li> <li>• Higher education</li> <li>• Fewer with children.</li> </ul>
<b>Purchasing Factors</b>	<ul style="list-style-type: none"> <li>• More interested in the features of a vehicle than in performance or efficiency.</li> <li>• More likely to admit that how a car looks is high on their list when considering a new vehicle.</li> </ul>	<ul style="list-style-type: none"> <li>• More likely to mention factors such as comfort, performance of the car, having the room for many passengers, reliability and safety/crash protection than fuel efficiency, cost or environmental issues.</li> <li>• Want vehicle with power and performance over fuel economy.</li> <li>• Bought base model with few options</li> <li>• See their vehicle as an appliance</li> <li>• Own newer vehicles, large cars, SUV's and pickups. More likely to own a Chevy, GMC, Dodge, Buick.</li> </ul>
<b>Trusted Sources</b>	<ul style="list-style-type: none"> <li>• Anecdotal information from family and friends</li> <li>• Unwilling to invest a lot of time in the purchase decision</li> <li>• Manufacturer's website</li> <li>• Used car sites to see the resale value</li> <li>• Side-by-side comparison websites.</li> <li>• Websites with insurance rates and price comparisons.</li> <li>• May use books which list all cars (i.e., consumer reports, lemon aid, or the blue book).</li> </ul>	<ul style="list-style-type: none"> <li>• Claim to research their choice, but appear to have a firm sense of brand/make/model loyalty</li> <li>• Anecdotal information from friends and family</li> <li>• Consumer magazine</li> <li>• Lemon Aid</li> <li>• Bank financier to see what others are buying</li> <li>• Dealers about particular features</li> <li>• Internet</li> </ul>

Source: Environics Research Group. 2005.

### 3.4 Hybrid Early Adopters

Some individuals have chosen highly fuel efficient vehicles without needing any external motivation. By defining the characteristics of early adopters we can hopefully find similarities with other segments in order to effectively target for future behaviour change programs.

#### 3.4.1 Institute of Transportation Studies (UC Davis) Hybrid Owner Research

In research conducted by Kurani and Turrentine (2007), early hybrid owners' reasons for purchasing a highly fuel efficient vehicle were examined. One of the most striking findings was that lower private fuel cost did not play a significant role in the purchase decision. Rather, hybrid owners chose a type of vehicle that (for them) symbolized something more (i.e., "the future", a less-consumptive lifestyle, that they are a smart consumer, cleaner air and lower oil consumption, less support for terrorism, high-tech content and high quality design).

Overall, people considering hybrids do not compare them to the non-hybrid model of the same vehicle. Instead they often compare vehicles across segments, and have actually jumped segments (e.g., SUV to compact) in order to buy a vehicle to which the above-mentioned list of “meanings” apply. In comparing high performance luxury vehicles to hybrids, often consumers are creating a new narrative about their vehicles and their lives. In an anecdotal story, Kurani described one study participant who previously had driven a Jaguar in his daily commute. When driving his vehicle, he imagined himself powerful and important and needing to get to where he was going as fast as possible. Once he switched to the Prius, the man saw himself in a new light — he was a responsible citizen who cared for the environment. As a result, he started seeing drivers of powerful vehicles as acting irresponsibly.

Kurani and Turrentine identified three common categories into which hybrid owners fall: 1) those who desire to preserve the environment; 2) those who seek energy independence; and 3) those who embrace new technology.

### ***3.4.2 Toyota’s Hybrid Owner Psychographic Segmentation***

In order to market the Toyota Prius, Toyota conducted psychographic segmentation to identify appropriate target audiences. Using the profiles and descriptions of likely hybrid buyers, Toyota was able to target media sources that connected with their intended audiences.

<b>Profile</b>	<b>Description</b>	<b>Media Used</b>
<b>Technology Pioneers</b>	Interested in the latest technology / innovation, and must be the first on the block to own	Quality Daily Newspapers; Discovery Channel; Internet
<b>Environmentally Friendly</b>	Recognise the environmental impact of motoring and would like to do something about it.	National Geographic; Vanity Fair; Classic FM
<b>Value Conscious</b>	Looking for ideal combination of high fuel economy and low maintenance.	Car Magazines

Source: NRCan Presentation. 2008.

### ***3.4.3 Hybrid Segment Summary***

It is worth noting that, while Kurani and Turrentine do not have a category for hybrid drivers who value financial savings from their vehicle, Toyota does. Kurani and Turrentine’s reasoning for the lack of interest in fuel savings among hybrid owners is that calculating the payback on the initial investment in the technology from fuel savings is difficult and likely beyond most consumers’ skill set. (More on this later). However, as will be discussed in the barriers section, the value of fuel savings may increase in significance if fuel prices increase.

## 4. Barriers to the Purchase of Fuel Efficient Vehicles

In this chapter, barriers to motivation and to action will be identified. The motivation section will be subdivided into knowledge barriers and belief barriers.

### 4.1 *Potential Barriers to Motivation*

Lacking motivation to purchase a more highly fuel efficient vehicle could stem from a complete lack of awareness about the issues, a lack of understanding about one's own personal emissions, or a disbelief in the issues or information. The following sections will examine barriers to motivation to act, which have been determined through consumer research or suggested by experts and stakeholders on the topic during the course of Pollution Probe's investigation of this topic.

#### 4.1.1 *Knowledge Barriers*

Given the recent rise in the price of fuel, most people are aware of the financial burden associated with poor fuel efficiency. However, despite this awareness, most people still do not really understand fuel efficiency or know what makes a vehicle more or less fuel efficient than another (except possibly vehicle size). Furthermore, some drivers lack environmental motivation to improve the efficient performance of their vehicle because they are unaware of the impact their vehicle has on the environment (i.e., 13 per cent of vehicle owners).<sup>24</sup> In these instances this lack of motivation is probably due to a disbelief in the affect of carbon dioxide on climate change rather than a lack of awareness.

The knowledge barriers that have been identified and researched are as follows: inability to calculate accurate fuel spending; inability to calculate payback on investment in fuel efficient vehicles; inability to compare vehicles by fuel efficiency due to lack of awareness of fuel economy ratings and labels, guides and programs.

**Knowledge of Fuel Costs:** In a study of automobile buyer decisions about fuel economy and fuel efficiency in 2004, Kurani and Turrentine found that, except in severely economically constrained households, drivers do not track their fuel costs over time. Individuals may know the cost of a fill-up, or the price of gasoline day-to-day, but this knowledge is usually forgotten after a brief time. Not paying attention to fuel costs over time means that consumers cannot make accurate assumptions about the financial savings they would receive by choosing a more fuel efficient vehicle.

**Inability to Calculate Payback on Investment:** Since most consumers do not track their fuel spending over time, they do not have the necessary information to make an economically rational decision about the fuel efficiency performance of their next

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<sup>24</sup> Desrosiers Automotive Consultants Inc. 2007. *Light Vehicle Study 2007*. Fuel Economy Report

vehicle. More to the point, if they lack knowledge of their current fuel expenses, they will be unable to calculate the payback on an investment in a more fuel efficient vehicle.

David Greene has extrapolated on Kurani and Turrentine's findings and has identified many other uncertainties consumers may face, making it even more difficult for a consumer to calculate the overall payback on their initial investment in a more fuel efficient vehicle:

- Consumers don't know their personal fuel efficiency performance or what it will be in a new vehicle option;
- Consumers don't know the future cost of gas;
- Consumers don't know how much they will drive in the future;
- Consumers don't know how long their vehicles will last, or how long they will keep them (this is relevant to total fuel savings and the trade-in value of the vehicle);
- Consumers don't know what sacrifices they may face in achieving increased fuel efficiency.<sup>25</sup>

**Inability to Compare Vehicles based on Fuel Efficiency:** The majority of Canadian consumers are not aware of government programs dedicated to communicating fuel efficiency. A recent survey of light-duty vehicle owners by DesRosiers Automotive Consultants found that only 22 per cent of Canadians are aware of Natural Resources Canada's annual fuel consumption guide, and that only 23 per cent are aware of the Energuide label for vehicles.<sup>26</sup>

There is a further barrier to consumers comparing among vehicles models; namely, that most ranking and labelling programs that consumers use are skewed towards comparisons within market classes. This has led to 'best in class' designations and labels that rank vehicles against others their segment. However, research from Kurani and Turrentine shows that often people who are considering hybrids compare them to vehicles in other segments, as well (e.g., hybrid cars versus higher-priced luxury vehicles). Restricting comparisons to within market classes may be a barrier for consumers who are receptive to comparisons across classes.

#### ***4.1.2 Belief Barriers***

Providing information to overcome knowledge barriers could serve to motivate people, but only if they believe in the issue and also believe that changing their purchasing behaviour, or re-evaluating their selection criteria for a new vehicle, will reduce their current contribution to greenhouse gas and air pollutant emissions.

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<sup>25</sup> Green. 2008. *Understanding the Market for Vehicle Fuel Efficiency*. Presentation at Pollution Probe workshop on Barriers to Fuel Efficient Vehicle Purchasing in Toronto.

<sup>26</sup> Desrosiers Automotive Consultants Inc. 2007. *Light Vehicle Study 2007*. Fuel Economy Report

This section focuses on the belief barriers that prevent consumers from choosing the most highly fuel efficient vehicle possible: they do not believe that there are fuel efficient options consistent with their lifestyles; they are sceptical of fuel efficiency estimates on labels, and whether a more fuel efficient vehicle will pay off in the end; or they do not believe that their personal vehicle emissions have an impact on the environment, atmosphere or climate.

**Fuel Efficient Options are not Lifestyle-Compatible:** Since consumers lack the knowledge of the engineering means to increase fuel efficiency, they generally retreat to the assumption that smaller equates to higher efficiency. A recent survey by CAASCO demonstrated that most members believed that switching to a fuel efficient vehicle would require a sacrifice of space.<sup>27</sup> Kurani suggests this is a remnant of the oil crisis of the 1970's, when vehicles shrank in reaction to the stringent CAFE regulations. Kurani and Turrentine have identified a distinction between how consumers regard the terms "fuel economy" and "fuel efficiency". For many consumers, *fuel economy* means "inexpensive" or "cheap" and "poor quality", while *fuel efficiency* is associated with high technology and high quality.<sup>28</sup>

Knowledge could be used to overcome this barrier, if social marketers demonstrate that often the same technology improvements could be used to deliver increases in horsepower or increases in fuel efficiency, depending on how the manufacturer chooses to incorporate the technology. On the other hand, promotion of highly fuel efficient vehicles that happen to be relatively large in size could also accomplish this (by debunking the small=efficient and large=inefficient myth).

Perhaps due to the association of fuel economy with smaller size, some consumers believe that fuel efficient vehicles are less safe than their larger, inefficient counterparts. In research conducted in 2005, NRCan identified a group of drivers who resent SUVs because they waste gas and are fearful of their size, pointing to the damage SUVs could inflict on passengers in smaller vehicles. Other researchers who characterize the group indicate that the individuals think their current car is already smaller than they would like, that they are anxious about safety and that they would refuse to downsize further. This group made up approximately 29 per cent of the Canadian population. Accompanying the perception that reduced size equates to reduced safety, this group also preferred proven technology and would rather avoid the risk of purchasing new technology available on the market.

Japanese automakers successfully introduced smaller, more fuel efficient vehicles into North America in the 1970s, and more recently with hybrid technology (i.e., Toyota Prius, Honda Insight, etc.). As a result, owners of Honda or Toyota models are most likely to believe that their vehicle is more fuel efficient than others within their class.

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<sup>27</sup> Huizing. 2008. *CAA Autogreen*. CAASCO Presentation at Pollution Probe workshop on Barriers to Fuel Efficient Vehicle Purchasing in Toronto.

<sup>28</sup> Kurani and Turrentine. 2004. *Automobile Buyer Decisions about Fuel Economy and Fuel Efficiency*. Institute of Transportation Studies, University of California, Davis, Research Report.

However, the higher fuel efficiency performance of certain Japanese products could potentially be a barrier for Canadians who are loyal to other automakers. Fuel efficient options should be available among all manufacturers and should be identified where possible, or else brand loyalty may become a large barrier to behavioural change, requiring a resource-intensive marketing campaign.

**Fuel Consumption Labels are Inaccurate:** The fuel consumption rating of a vehicle is based on estimates generated in laboratory testing conditions, rather than real-world driving experience. Driving behaviour, weather conditions, use of accessories (i.e., air conditioning, heated seats, etc.), and road and terrain are just a few factors that can significantly affect vehicle fuel consumption. The EPA has recently adjusted its fuel economy label in an attempt to more accurately reflect real-world expectations of vehicle fuel economy, but this is still an estimate and does not accurately predict the fuel economy performance an individual will actually observe. As a result, consumers are sceptical of the fuel efficiency ratings for vehicles. Consequently, individuals may discount the value of the estimated fuel savings based on what they perceive to be dubious efficiency ratings, and thus may not be willing to pay a premium for highly fuel efficient models. This consumer behaviour phenomenon has been identified by Kahneman and Tversky as “consumer loss-aversion”.<sup>29</sup>

**Fuel Consumption and Emissions are not a Problem:** As indicated earlier, a 2007 study found that 13 per cent of Canadian drivers did not believe that *their* vehicles contribute to climate change.<sup>30</sup>

## 4.2 *Potential Barriers to Action*

Despite awareness of (and motivation to) purchase fuel efficient vehicles, barriers to the adoption of a new vehicle purchasing behaviour can still exist. There appears to have been little research conducted on what barriers consumers encounter even when they are motivated to purchase a fuel efficient vehicle. Such action barriers could be supply issues, prohibitively expensive technology, and competing and confusing messaging from automotive manufacturers and dealers.

**Supply Issues:** Hybrid technology is still new and total hybrids sales do not make up more than a small fraction of the total vehicle market (approximately 2.5 per cent<sup>31</sup>). Yet, as is often reported in the media, consumer demand for hybrids has led to long waiting lists.

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<sup>29</sup> Green. 2008. *Understanding the Market for Vehicle Fuel Efficiency*. Presentation at Pollution Probe workshop on Barriers to Fuel Efficient Vehicle Purchasing in Toronto.

<sup>30</sup> Desrosiers Automotive Consultants Inc. 2007. *Light Vehicle Study 2007*. Fuel Economy Report

<sup>31</sup> Omotoso, M. 2008. *Alternative Powertrain Sales Forecast*. J.D. Power and Associates, The McGraw-Hill Companies, Inc. Presentation at UM Automotive Research Conference: Marketing New Powertrains: What Are Drivers Willing to Buy and How Do We Know?

**Expensive Technology:** Even if consumers are motivated to purchase a highly fuel efficient vehicle, they may be discouraged by the initial purchase price. (See the previous section on knowledge barriers for information on issues with payoff calculations and risk-averse consumers.)

**Competing Messaging:** There are competing messages and elements of “greenwashing” at play in the market for fuel efficient vehicles. Consumers can easily be confused by the mixed messages and this confusion could lead to purchase decisions that are not consistent with the consumer’s initial motivation to purchase a “green” vehicle. Automobile marketing and messaging campaigns can be very effective. Experts have noted that automakers are best-positioned to clearly and accurately communicate the virtues of fuel efficiency. However, if automakers pursue other marketing aims, then strategic communication and marketing may be employed to counter competing messaging.

In addition, little research has been conducted to characterize the role that dealers play in consumer purchase decisions, particularly for those who are motivated to purchase highly fuel efficient vehicles. Dealers could be an action barrier if they steer consumers away from fuel efficient models.

## 5. Summary

This background paper has identified specific barriers which may prevent consumers from purchasing highly fuel efficient vehicles. The barriers have been categorized as knowledge and/or belief barriers or action barriers.

Knowledge or belief barriers are those that stop consumers from wanting a more fuel efficient vehicle. These may be:

- *Knowledge of fuel costs.* Most consumers don't know their true fuel costs over time and consequently can't figure out how much financial savings a fuel efficient vehicle might bring.
- *Ability to calculate payback on investments.* Since most consumers don't know how much a fuel efficient vehicle might save them, they can't know whether an investment in fuel efficiency will pay off.
- *Ability to compare vehicles.* Most consumers aren't aware of federal programs that publish fuel efficiency information that can help in comparing vehicles. A secondary barrier is that ranking tools usually compare vehicles within a class, which is a barrier to consumers comparing across classes.
- *Belief that fuel efficient options are not lifestyle compatible.* Many consumers believe that switching to a highly fuel efficient vehicle requires a sacrifice of space or power.
- *Belief that fuel efficient vehicles are unsafe.* Perhaps a result of the previous belief, consumers believe that a fuel efficient vehicle requires a sacrifice of safety.
- *Belief that fuel efficient vehicles are low quality.* Some consumers equate fuel efficiency with small and cheap. Additionally, some consumers believe that the manufacturers of more efficient vehicles (i.e., Honda and Toyota) have lower quality than American manufacturers.
- *Belief that fuel consumption labels are inaccurate.* Fuel consumption ratings are estimates and do not portray real world experiences. As a result, consumers mistrust labels and question what fuel consumption they will really get.
- *Belief that fuel consumption and emissions are not a problem.*

Action barriers are those that stop consumers who want a more fuel efficient vehicle from making the final purchase. These may be:

- *Supply Issues.* Since fuel efficient vehicles involve new technology, limited production — not limited demand — may inhibit the purchasing of highly fuel efficient vehicles.
- *Expense.* New technology is expensive and may deter motivated consumers.
- *Competing messaging.* Greenwashing by manufacturers may confuse consumers about what environmental performance features are important.
- *Dealer Influence.* There is relatively little research on the influence dealers may have on the purchase decision of a consumer motivated to purchase a fuel efficient vehicle.

Research is necessary to determine which barriers would be the most effective to target in an education, social marketing or political campaign. In order to do this, the following questions should be answered for each barrier:

- What is the outcome of overcoming the barrier?
  - Will it significantly alter the purchase decision?
  - How important is it to target the barrier?
  - How large an audience will it affect?
- What resources are required to overcome the barrier?
  - How feasible is it to target the barrier?
  - What interventions would be most useful in targeting the barrier?

Audience segments have also been identified in this background paper. Segmentation by market research based on drivers' attitudes towards their vehicles' impact on the environment identified four psychographic segments of drivers:

- Enlightened Adopters
- Confused Seekers
- Passive Receptives
- Unapologetic Drivers

Segmentation by consumer behaviour analysis on the other hand was based on drivers' environmental ideology.

Environmental "Greens" — environmental activists, boosters and anxious  
Environmental "Cynics" — apathetic mainstream, fatalistic bystanders, environmental hostile

Based on initial segmentation, further segmentation produced five psychographic segments of drivers:

- Hard-core supporters
- Environmentally friendly
- Value seekers
- Experiential buyers
- Hard-core critics

Further research could update these segmentations and identify specific barriers each is encountering. This would enable future fuel-efficiency campaigns to target the audiences that will be the most swayed.