



# OBSERVATIONS

Dennis DesRosiers

## Fuel Efficiency: Are We Building a Religion in Canada?

New websites often have difficulty getting noticed. Social networking juggernauts Facebook and Myspace took years to reach critical mass, while even the most popular blogs require weeks to build a thousands-strong readership. Online success is contingent on a killer concept and a reason to return.

"Fuely" (<http://www.fuely.com/>), a new website from the creators of Metafilter.com, combines fuel economy (FE) with social networking. Normally the province of fringe anoraks, "Fuely" divorces mileage tracking from the spreadsheets and foil hats that have long characterized this black sheep of driving enthusiasm. "Fuely" allows users to track their vehicle's energy consumption in an entertainingly-competitive public forum. Its cheerful graphics and lack of eco-concerned browbeating send potential users the right message: caring about your fuel economy is perfectly normal and conducive to your economic well-being.

Within days of its mid-August launch, "Fuely" had outstripped its creators' popularity projections, attracting a large and eager user base. The website's community continued to snowball over the ensuing weeks. While Fuely is successful at communicating the normalcy of its concept to users current and future, it also telegraphs an even more fundamental message to the large automotive

world: normal people - people driving Chevrolet Malibus and Honda Pilots and Toyota FJ Cruisers - are tracking their mileage and modifying their driving behavior, potentially gaining pleasure and regaining some dollars lost to years of lead-footedness. Indeed, one of the biggest upsides to owning a hybrid vehicle is the value owners place on obtaining optimal fuel efficiency. It is amazing how "responsible" people become when they start driving a mileage-oriented vehicle. FE is hot, mainstream and gaining steam among those who prefer powerful, fuel-inefficient cars - and it's becoming big business.

In recognition of this discipline's newfound currency, I thought it appropriate to devote an Observation to the recent history of fuel efficiency in Canada. Specifically, I believe it important to counter the myth that vehicles have grown inefficient in recent decades - that the largeness of the past few vehicle generations has translated into consumer largesse at the pumps. Additionally, it's important to hammer home the truly frugal purchasing habits of Canadian consumers. Whether by deliberate choice, subconscious zeitgeist-following or happy accident, the vehicles we buy and drive represent a mix trending towards the most fuel-efficient end of the market. Improvements have not been radical, but they are present.

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To determine what sort of progress has been made, we grounded ourselves in statistical data based on national vehicle registrations from Polk Canada (absolute counts of every vehicle on the road in this country) cross-referenced with Canada EnerGuide FE numbers for every one of those vehicles. This isn't a perfect methodology since FE ratings are notoriously inconsistent but it is as good a way of quantifying FE as any in existence. The other issue is that this analysis measures the FE of vehicles on the road as of July 2007, not in the year they were originally sold. We know that the most fuel efficient vehicles (often subcompact and compact cars) have a high scrappage rate so the FE of the remaining vehicles would be a little higher than the average that actually existed in the base year.

By statistically analyzing FE, we were able to learn a great deal about the sorts of efficiency-related choices Canadians have been making over the past twenty seven years.

**Total Fleet Fuel Efficiency**

Examining the average FE of vehicles on the road by model year across Canada can be quite revealing. During the 1980s and into the early 1990s, our national average FE was essentially in the 11.0 L/100 KM range. It ranged up and down, a little better some years but a

**Canadian Average Vehicle Fuel Efficiency (L/100KM)**

Model Year	Canada
1984	10.95
1985	10.77
1986	10.93
1987	10.70
1988	10.93
1989	11.12
1990	10.99
1991	10.64
1992	10.85
1993	10.72
1994	10.98
1995	10.72
1996	10.62
1997	10.47
1998	10.59
1999	10.58
2000	10.45
2001	10.27
2002	10.27
2003	10.38
2004	10.51
2005	10.09
2006	10.14
2007	9.82

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little worse in others. By the late 1990s, it had improved to the mid-10.5 L/100 KM range.

*FE (fuel economy) is hot, mainstream and gaining steam among those who prefer powerful, fuel-inefficient cars - and it's becoming big business.*

Over the last five to eight years, it has improved to the low 10.0 L/100 KM range and finally, for the first time, broke the 10.0 L/100 KM barrier in 2007.

Canada has essentially experienced about a 1 L/100 KM improvement in fuel efficiency over this 25 year period (roughly 10 percent). I'll discuss the implications of this later in this Observation.

**Segment by Segment**

Segment by segment, Canadians have made smarter choices in nearly every nook and cranny of the marketplace although there are some outliers. For instance, two segments showing just

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## Fuel Efficiency of Canadian Vehicles - by Segment (L/100KM)

Model Year	Sub. Car	Comp. Car	Int. Car	Sport Car	Lux. Car	Lux. High	Lux. Sport	Small SUV	Int. SUV	Large SUV	Lux. SUV	Small Pickup	Large Pickup	Small Van	Large Van
1982	6.65	7.79	10.93	10.66	10.95	11.77	11.39	11.02	13.44	12.99	0.00	9.36	12.14	10.82	14.01
1990	6.73	8.65	10.03	8.98	10.81	12.38	12.17	11.62	13.65	16.69	16.39	11.27	14.94	11.63	15.13
2000	7.29	8.22	9.91	9.64	10.18	11.24	10.98	11.27	13.44	15.73	13.49	12.23	14.59	11.25	15.29
2001	7.32	7.91	9.73	9.34	10.21	11.11	10.66	10.90	13.59	16.16	12.92	12.68	15.55	11.18	14.36
2002	7.52	7.96	9.60	9.27	10.18	11.00	10.92	10.96	13.34	15.81	13.64	12.83	15.18	11.29	15.02
2003	7.33	7.82	9.28	9.31	10.08	10.88	11.04	10.75	12.95	14.91	13.59	13.14	15.38	10.97	16.17
2004	7.34	7.68	9.40	9.49	9.91	11.10	11.05	10.80	12.87	15.27	12.59	12.17	15.94	10.88	16.35
2005	6.80	7.44	9.19	10.05	10.23	10.69	10.83	10.57	12.75	15.11	12.72	11.80	15.21	10.99	15.71
2006	6.98	7.48	9.40	9.67	9.96	10.91	11.17	10.31	12.16	14.47	12.60	12.07	15.05	10.93	15.74
2007	6.75	7.65	9.11	9.63	9.88	11.13	11.14	10.17	11.93	13.78	12.30	11.95	14.57	10.92	15.49

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incremental improvements are the subcompact and compact car groups. Model year by model year, the changes are quite erratic. FE deteriorated through most of the 1980s within both groups, stabilized during the 1990s and has only started to improve within the past 5 to 7 years. The FE of both small car segments is not that much different today than 25 years ago although getting to today's position has been a roller coaster ride.

Large and Luxury SUVs have witnessed the biggest improvements. Large SUVs were consistently in the high 16.0 L/100 KM range and have improved to under 14.0L in 2007. Luxury SUVs have improved even more, reaching the low 12 L/100 KM range in recent years. This is likely the result of these products crossing over from light truck to passenger car platforms.

Intermediate Sport Utilities have also benefited from the above-noted change in construction

philosophy, improving from the high 13 L/100 KM level to below 12 L/100 KM in 2007.

Vehicles targeted primarily for commercial use - Small and Large Pickups together with Large Vans - are problematic. Each of these segments has gone in the opposite and some would say wrong FE direction. Small pickups deteriorated from the 9 L/100 KM range to the 12 L/100 KM range, large pickups from 12 L/100 KM to 15 L/100 KM and large vans from 14 L/100 KM to 15.5 L/100 KM.

This is problematic for policy makers. First, these segments typically account for about 1 out of every 5 vehicle sales so they are quite popular. Second, their commercial use requires substantial horsepower so it is difficult to extract additional FE. Third, they are owned by politically sensitive groups like small businessmen and farmers. Last, they have become an

increasingly popular vehicle choice for personal use and it is impossible to distinguish between the two owner groups so policy makers avoid regulating these segments. For instance, they were exempted from the Federal Feebate system.

### Brand Matters

One of the more basic sorts of efficiency analyses is to examine FE by brand - namely, how each OEM's present "installed base" of vehicles compares as of mid-2007. Keep in mind that these statistics include all model years of same-brand vehicles currently registered. For instance, Toyota's average 2007 FE of 8.47 L/100 KM takes into account not only 2007 models, but rather every Toyota registered for road use in 2007. According to our vehicle scrappage analysis (covered in this space last August), the average vehicle is on the road in Canada for roughly 20 years, so

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**Survival Rates by Segment**

Model Year	Entry Level	Mid-sized/ Family	Large/luxury Panel Van	Pick-up Truck/ Panel Van
2007	100.0%	100.0%	100.0%	100.0%
2006	100.0%	100.0%	100.0%	100.0%
2005	100.0%	100.0%	99.3%	95.8%
2004	99.0%	99.7%	97.9%	96.4%
2003	96.8%	97.0%	99.9%	98.7%
2002	97.2%	97.9%	98.4%	96.1%
2001	96.8%	96.2%	96.3%	91.1%
2000	94.3%	91.2%	93.4%	87.5%
1999	93.5%	85.9%	84.2%	87.0%
1998	93.0%	80.2%	85.1%	76.8%
1997	86.1%	80.2%	73.3%	81.7%
1996	80.6%	78.7%	76.7%	86.5%
1995	70.0%	72.4%	74.7%	86.8%
1994	59.7%	65.6%	70.4%	85.4%
1993	49.1%	56.2%	66.5%	81.3%
1992	40.1%	48.9%	63.1%	76.0%
1991	32.4%	39.9%	58.4%	67.5%
1990	24.1%	28.6%	51.0%	57.4%
1989	15.6%	17.9%	29.0%	48.0%
1988	10.4%	13.5%	25.2%	41.5%
1987	7.7%	9.9%	21.3%	19.6%
1986	6.2%	8.1%	18.5%	26.9%
1985	4.0%	6.6%	14.8%	23.8%
1984	3.2%	5.6%	11.8%	22.5%
<b>Total</b>	<b>60.8%</b>	<b>61.7%</b>	<b>67.0%</b>	<b>72.3%</b>

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each OEM's FE number in this analysis includes brand new vehicles and decade-old stragglers as well. The FE of their current vehicles would be improved compared to vehicles sold in the past.

intermediate cars, small vans and small pickups, Honda avoids the FE pratfalls of Full Size Pickups and Large SUVs. Volkswagen, known for its miserly diesel offerings, follows with an 8.31 L/100

KM average, while Toyota (8.47 L/100 KM) rounds out the full-line top-three. Of note is that Toyota achieves this rating while offering V8-powered Large SUVs and Full Size Pickups.

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**Fuel Efficiency of Vehicles on the Road - By Brand - as of July 2007**

**Top Seven**

Brand	(L/100KM)
smart	4.22
MINI	7.51
Saturn	8.10
Honda	8.17
Volkswagen	8.31
Toyota	8.47
Hyundai	8.59

**Bottom Seven**

Brand	(L/100KM)
GMC	14.25
Land Rover	14.64
Maserati	15.54
Rolls Royce	16.04
Bentley	17.08
Ferrari	17.79
Lamborghini	19.14

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The most fuel efficient automaker operating in Canada - if a strictly by-the-numbers attitude prevails - is Mercedes-Benz's smart brand. Given the single-vehicle nature of the smart showroom, a more 'useful' winner exists in Honda, the highest-ranked full-line vehicle manufacturer on the list. With an FE average of just 8.17 L/100 KM spread across a lineup of subcompact cars, compact cars, intermediate cars, luxury sports cars, compact SUVs,

**Average Age of the Vehicles on the Road in Canada by Province**

	1990	2000	2001	2002	2003	2004	2005	2006	2007
<b>Canada</b>	<b>7.25</b>	<b>8.45</b>	<b>8.54</b>	<b>8.53</b>	<b>8.47</b>	<b>8.48</b>	<b>8.40</b>	<b>8.35</b>	<b>8.36</b>
Newfoundland	6.48	8.17	8.22	8.19	8.21	8.07	8.19	8.07	7.93
PEI	7.65	9.44	9.48	9.61	9.63	9.56	9.54	9.36	9.33
Nova Scotia	6.71	8.15	8.24	8.32	8.25	8.14	8.09	8.02	7.92
New Brunswick	7.23	8.79	8.94	8.98	9.00	9.06	8.90	8.85	8.76
Quebec	6.32	7.96	8.04	8.09	8.06	7.99	7.92	7.89	7.84
Ontario	6.83	7.88	7.94	7.91	7.82	7.88	7.89	7.87	7.89
Manitoba	8.17	9.43	9.50	9.52	9.79	10.07	9.47	9.42	9.54
Saskatchewan	9.67	10.72	10.78	10.77	10.76	10.70	10.67	10.62	10.51
Alberta	8.46	9.14	9.18	9.07	8.78	8.87	8.74	8.57	8.49
British Columbia	8.25	9.27	9.48	9.53	9.53	9.49	9.38	9.26	9.36

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At the other end of the spectrum, the least fuel efficient manufacturers are those most beholden to the ultra-sports and ultra-luxury markets. It should come as no surprise that the top-five least FE-positive brands are Lamborghini, Ferrari, Bentley, Rolls-Royce and Maserati - none among the group scoring an average FE rating better than 15.5 L/100 KM. Despite a vehicle mix heavy with V8-powered commercial vehicles, full-line GM brand Chevrolet manages a midpack average of 11.3 L/100 KM.

**Four, Six or Eight?**

When we boil the FE question down to its bare bones - stripping the data of segmentation, geographical or brand-related information - it is possible to reveal the most low-level sort of efficiency statistics. Most anyone would assume that a four-cylinder engine is more economical to operate than a six or eight

cylinder, but by what margin? Has the industry improved its fuel efficiency across the board, or were the above-cited segment-by-segment FE gains achieved through changes in the popular vehicle mix (i.e., consumers shifting from 6-cylinder Intermediates to their 4-cylinder counterparts)?

Mix changes may well have occurred, but the numbers show a steady improvement across all engine types. Of special note is the growth in efficiency among V8-powered vehicles. Between 2000 and 2007, the V8-powered vehicles Canadians chose to purchase became 17.8 percent more fuel efficient, with the average FE of these cars and

**Engine Fuel Efficiency (L/100KM)**

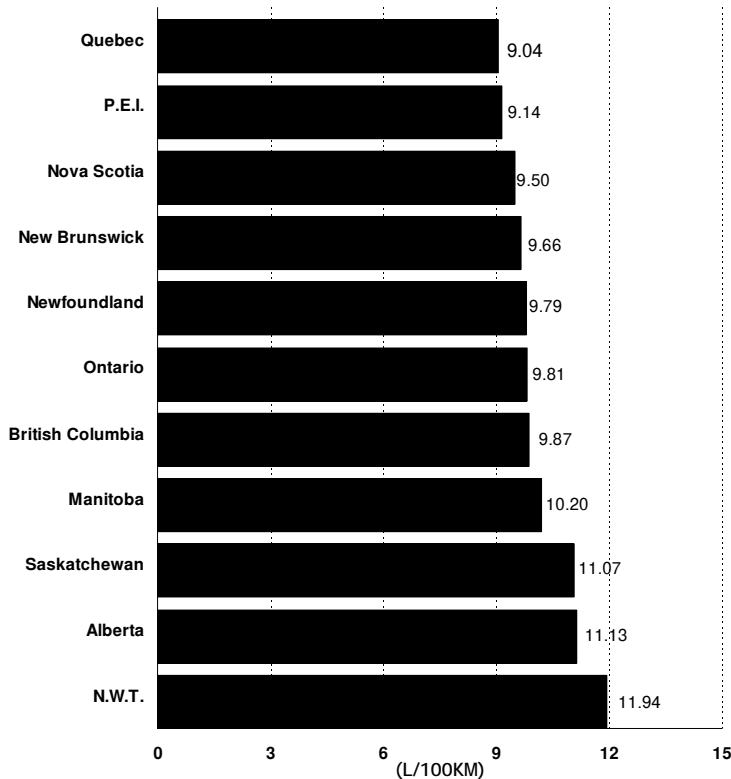
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NO. CYL	1982	1990	2000	2007
3	N.A.	5.27	4.60	N.A.
4	8.87	8.55	8.42	8.41
5	9.50	11.22	10.25	10.91
6	11.21	11.55	11.25	10.54
8	14.03	14.88	14.65	12.44
10	N.A.	N.A.	15.26	N.A.
12	12.38	15.71	16.46	N.A.
2R	10.39	11.81	N.A.	N.A.

R = Rotary Engine

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## Average Canadian Vehicle Fuel Efficiency 2007 - By Province



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trucks falling from 14.65 L/100 KM in 2000 to a more reasonable 12.44 L/100 KM in 2008. Despite rising horsepower levels, the widespread deployment of 6-speed automatic transmissions, cylinder deactivation systems, direct injection and other fuel-saving technologies has had a measurable effect on national fuel consumption levels. In segments where V8 power is necessary (such as Full Size Pickup and Large Van), progress - albeit slow progress - is occurring. It is interesting to look at what consumers did in

response to these improvements. In the late 1980's consumers moved to 6-cyl pickups to gain efficiency. But as FE of 8-cyl engines improved they moved back to these more powerful engines. This actually hurt FE in pickups. Yes 8-cyl engines are much more FE today than a decade ago but they are less FE than any 6-cyl engine. Consumers choose a less fuel efficient but more powerful 8-cyl engine over a more fuel efficient but less powerful 6-cyl engine. So by improving FE of the 8-cyl engines the OEM's actually

hurt overall average fuel efficiency.

### Geographically

As with most matters Canadian, there exist major province-to-province differences stemming from our varied economic and topographic conditions. For example, the Full Size Pickups required on Alberta's farm and oil fields find comparatively few fans in four cylinder strongholds like Quebec and Ontario.

Not surprisingly, the least fuel-efficient markets in Canada are those with the highest demand for V8-powered commercial vehicles. The Northwest Territories - rich in resources and resource-based industry - has had the worst average FE for two decades. Other provinces with consistently high petro-thirst include Alberta, Saskatchewan and British Columbia.

At present, Quebec (9.04L/100KM), Prince Edward Island (9.14 L/100 KM), and Nova Scotia (9.50 L/100 KM) are Canada's most fuel efficient provinces. These numbers reflect both generally-poorer regional economic conditions as well as a lessened commercial reliance on heavy vehicles.

All provinces have displayed major gains over the past 25 years - many in the range of 30 percent - but the rate of

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**Replacment vs Discretionary Demand in Canada 1990-2007**

Year	Vehicles on the Road	Percent Change	Replacment Demand	Discretionary Demand	Light Vehicle Sales
1990	15,128,911		1,067,287	218,501	1,285,788
1991	15,308,106	1.2%	1,027,155	239,327	1,266,482
1992	15,331,338	0.2%	1,117,182	87,166	1,204,348
1993	15,509,253	1.2%	909,525	255,152	1,164,677
1994	15,691,368	1.2%	894,563	330,386	1,224,949
1995	15,724,638	0.2%	1,104,916	25,295	1,130,211
1996	15,823,004	0.6%	878,783	294,307	1,173,090
1997	16,077,301	1.6%	924,159	463,791	1,387,950
1998	16,535,877	2.9%	894,539	494,589	1,389,128
1999	17,071,382	3.2%	744,136	756,963	1,501,099
2000	17,100,899	0.2%	1,270,880	278,561	1,549,441
2001	17,667,665	3.3%	794,118	776,511	1,570,629
2002	17,910,647	1.4%	1,163,251	539,995	1,703,246
2003	18,207,157	1.7%	1,182,548	410,958	1,593,506
2004	18,709,017	2.8%	933,726	600,689	1,534,415
2005	18,882,567	0.9%	1,274,521	308,770	1,583,291
2006	19,365,344	2.6%	1,060,392	554,309	1,614,701
2007	20,242,775	4.5%	778,149	875,239	1,653,388

Note: Disappearance includes vehicles scrapped as well as used vehicle exports

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change has slowed in regions with a historical preference for fuel efficient vehicles.

Quebec, for example, showed an average 2008 FE rating just 0.5 percent better than its 2000 equivalent.

**What it Means**

In the segments most popular among Canadians, FE improvements over the past decade have been limited to roughly 10 to 15 percent. The fundamental issue - both here and in the U.S. - is that governments refuse to deliver the FE message to consumers. They dance around the issue,

attempting to attack the problem through the corporate angle or by offering consumers

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*The markets in North America are in their third year of decline with most pundits predicting at least another year or two of soft sales.*

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incentives for fuel-sipping vehicle choices, but they stubbornly refuse to tell the consumer what he does not want to hear: horsepower levels need to fall.

Everybody loves power and we've been spoiled by the past few generations of exceptionally powerful products. Would the Honda Civic remain Canada's top seller if it had fifty fewer horsepower under the hood? Regardless of improvements in suspension, interior accommodations, reliability and general refinement, it is downright doubtful that consumers would flock to a 90 horsepower Civic in great numbers.

The past 15 to 20 years have seen horsepower levels rise across all vehicles. We haven't attempted to quantify this

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properly, but our "back of the envelope" guess would be somewhere between 50 to 65 horses per vehicle. Given this, it is a technological miracle that the automotive sector has actually delivered a 10+ percent improvement in FE. Our governments don't give the OEMs credit for this success. Our governments simply say, "Imagine how fuel efficient vehicles would be if horsepower had not increased." This may be true but no-one would be buying these vehicles.

Given this record of marginal improvement in fuel efficiency - and given the incredible amounts of technology and pure engineering genius thrown at the automobile during this same period - is it unreasonable to expect equally small gains during the next decade? Diesel and hybrid powertrains can potentially meet targets, but these are not solutions in themselves.

The auto sector is between a rock and a hard place - hamstrung by a buying public addicted to horsepower while simultaneously compelled to participate in a regulatory environment that proposes impossible-to-meet FE targets concurrent with ever-ratcheting safety standards. Weight - a byproduct of safety equipment - limits FE.

The U.S. government has set 35 MPG as the regulated standard for 2020 (6.72 L/100 KM in Canada). Let me say what everyone refuses to acknowledge: These standards are impossible to meet.

Think about this: In Canada, we have witnessed a 1 L/100 KM improvement in the last 25 years moving from 11 L/100 KM to 10 L/100 KM (roughly 10%). And this was an era of unprecedented technological improvement. Does anyone truly believe that we can now move to below 7 L/100 KM in the next 12 years? I fully understand the potential for hybrids, electrics and other advanced powertrains but this level of improvement is just not achievable.

The endgame is not pretty. As I write these words, GM and Chrysler are deep in merger talks, the outcome of which may have serious repercussions for many directly or indirectly supported by both of these companies. The markets in North America are in their third year of decline with most pundits predicting at least another year or two of soft sales. The very survival of the North American auto industry is presently at risk.

Is this not the time to set aside climate change worries and focus on the immediate pressures of industrial survival? Many will shy away from proposing this solution due to the near-religious dedication of the climate change lobby, but it needs to be entertained and pursued. The

issue of fuel efficiency can be revisited in several years when economic pressures have subsided. It is the consumer driving the vehicle companies' product mix and a continually tightening regulatory noose will do nothing to change consumer purchasing behaviour. There is no shortage of fuel efficient cars available for purchase, yet people continue to buy varying gradations of inefficient vehicles. The recent movement away from Large SUVs may suggest a positive turn, but many of these consumers are simply switching to large crossovers - vehicles which also struggle to break 12 L/100 KM.

There is still a question as to the true impact of vehicle emissions on the global climate model. Quite simply, if CAFE targets are impossible to meet - or impossible to meet without breaking our industry's back - then we are at risk of diverting billions of scarce capital into an agenda item whose impact is questionable. Our house is burning and we're mowing the lawn. **DAR**

*Please note: The data pooled in this Observation is only at a Macro level. For more detailed information in regards to DesRosiers Fuel Economy research, please contact Lisa Marchese at (905) 881 0400 ext. 28.*