



**Canadian Vehicle
Manufacturers' Association**
Association canadienne
des constructeurs de véhicules

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Dr. Michael Rensing
Director, Low Carbon Fuels
Electricity and Alternative Energy Division
B.C. Ministry of Energy, Mines and Petroleum Resources
PO Box 9314 Stn. Prov. Govt.
4th Floor, 1810 Blanshard St.
Victoria, B.C. V8W 9N1

Subject: British Columbia Low Carbon Fuels 2017 Compliance Pathway Assessment

Dear Dr. Rensing:

The Canadian Vehicle Manufacturers' Association (CVMA) representing FCA Canada Inc., Ford Motor Company of Canada, Limited, General Motors of Canada Company appreciate the opportunity to review and comment on British Columbia's Low Carbon Fuels 2017 Compliance Pathway Assessment.

CVMA members are supportive of appropriate measures to reduce fuel cycle carbon and to maintain or reduce vehicle tailpipe emissions from legacy, new, and future vehicles. Vehicles and fuels operate as an integrated system to provide the balance of low greenhouse gas (GHG) emissions and low criteria air contaminant emissions while providing the long term durability needed to maintain these attributes for the life of a vehicle. Vehicle-fuel compatibility is key to maintaining the long term durability and environmental performance expected from vehicles.

Actions or policies towards low carbon fuels need to ensure that measures are in place for legacy vehicles to have access to appropriate fuels as advancements are made to new vehicle and fuel technologies. Advanced fuel compositions, including high octane fuels (HOF), present an opportunity to further reduce lifecycle carbon/GHGs from future vehicle technologies and there are several initiatives underway in the U.S. investigating the optimum appropriate fuel properties and engine technologies. This work also includes supportive activities like misfuelling prevention such as vehicle to pump communication needed to support these future developments. (Example references; Co-Optimization of Fuels and Engines, and CRC HOF/Ethanol AVFL-20 projects).

More importantly, the Province needs to ensure its LCFS pathway is flexible enough to accommodate measures to support advancing vehicle technologies, while protecting legacy vehicles, for vehicle technologies sold across an integrated North American market and compliment activities under Canada's developing Clean Fuel Standard. A harmonized approach is required in this regard.

Our specific comments on the 2017 Compliance Pathway Assessment document are as follows:

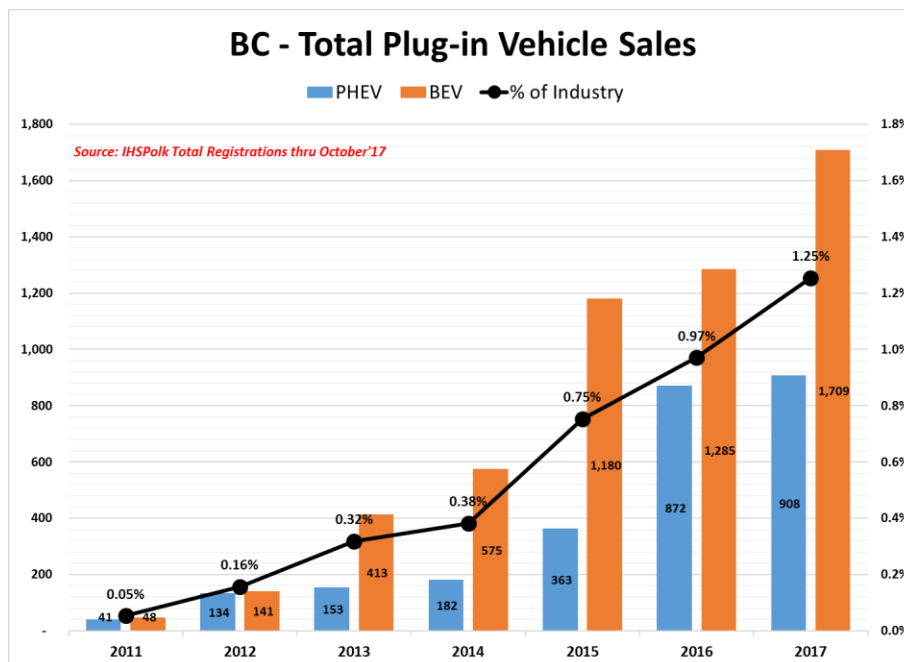
Section 5: Propane

Propane is not compatible with Tier 2 or Tier 3 emissions certified vehicles because of the high sulphur content. The legal requirement for an odorant in propane which allows for atmospheric detection at concentrations that are one fifth of the lower flammable limit results in sulphur content that exceeds the acceptable limit for these vehicles. Due to the odorant, the typical sulphur content of automotive grade propane is over 100 ppm. Tier 2 vehicles (produced from 2004 to 2016 MY) must be operated on fuels containing 30 ppm sulphur (S) average and 80 ppm S maximum. Tier 3 vehicles (from 2017 MY and later) must be operated on fuels containing 10 ppm S average and 80 ppm S maximum. Operation of Tier 2 or Tier 3 vehicles on fuel containing sulphur levels higher than that designed for will result in sulphur poisoning of the catalytic convertors subsequently resulting in tailpipe emissions that exceed emission regulations. This can also impact the on-board diagnostics that are required to indicate when levels exceeding ~1.5X its designed emission performance are exceeded.

With Tier 3 vehicles at virtually zero emission performance the parameters are extremely stringent and slight excursions to emission performance will be indicated to the vehicle operator. Sulphur poisoning is only partially reversible under limited conditions requiring sustained operation on extremely low sulphur fuel (less than 10 ppm) for extended high speeds and loads. Therefore, propane conversion of any Tier 2 or Tier 3 vehicle will result in permanently increased smog causing emissions from that vehicle. Propane conversions are not endorsed by any OEM on Tier 2 (passenger cars, light duty trucks or medium duty passenger vehicles (up to 10,000 lb. GVWR) or Tier 3 vehicles (passenger cars, light duty trucks, medium duty passenger vehicles, heavy duty pickup trucks or vans (up to 14,000 lb. GVWR). This is not a suitable pathway for these vehicles.

Section 7: Electricity

The EV analysis is incomplete and does not include PHEV models only those that are pure EVs. This discounts the benefits offered by PHEV models particularly in areas where charging infrastructure is not sufficiently developed to provide the necessary confidence for EV owners to operate their vehicles without the risk of running out of range.



Approximately one-third (1/3) of the plug-in vehicles sold in B.C. to date are PHEV models and failing to recognize that these models provide GHG benefits is a significant flaw in this pathway analysis. All electric driving for PHEVs may be higher than pure EVs as they are not constrained by the developing EV charging infrastructure and can use their full electric range on each charge.

Section 10: Methanol

Methanol is not suitable as a motor fuel due to the highly corrosive nature of this alcohol. Fuel systems, engines and exhaust systems must be designed for methanol and since the 1980's when OEM's developed methanol capable vehicles no vehicles have been designed for this fuel. Current vehicles cannot tolerate methanol concentrations in excess of 0.5% m/m in ethanol when blended into gasoline. Severe fuel system and engine damage will result if this methanol concentration is exceeded.

Section 11: Ethanol

In a number of areas of this analysis reference is made to the U.S. EPA opinion that post 2000 model year vehicles can operation on gasoline-ethanol blends of up to 15%. This opinion has been determined to be incorrect by the factual evidence produced by the Coordinating Research Council (CRC)¹ who conducted a broad range of tests on mid-level (greater than 10% ethanol blend) compatibility with vehicles and fuel system components and concluded that E15 blends are not suitable for legacy vehicles. OEMs have only recently begun to certify and warranty their new vehicles to operate on E15 blends. The API survey indicates that OEMs began certify vehicles as follows:

Manufacturer	Model Year																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
BMW	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Chrysler	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Most ⁶	Most ⁵
Ford	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
GM	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Most ⁴	Most ⁴	Most ⁴
Honda/Acura	No	No	No	No	No	No	No	No	No	No	No	No	No	Some ⁴	Yes	Yes	Yes
Hyundai/Kia	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Most ⁷
Jaguar/Land Rover	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Mazda	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Mercedes	No	No	No	No	No	No	No	No	No	No	No	No	No	No ¹	No ¹	No	No
Mitsubishi	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Nissan/Infiniti	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Subaru	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Toyota/Lexus	No	No	No	No	No	No	No	No	No	No	No	No	No	Some ³	Most ⁵	Most ⁵	Yes
VW/Audi/Porsche	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Volvo	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

E15 Chart Sources:
<http://www.edmunds.com/ownership/howto/articles/120189/article.html> and auto company contacts

¹Accord, Civic, Crosstour, CR-V, CR-Z, Insight, Odyssey, Pilot; Acura: ILX, MDX, RDX, RLX, but not TL, TSX, TSX Wagon

²Some owner manuals for 2014 and 2015 incorrectly stated that E15 was allowed.

³Avalon, Camry, Corolla, Highlander, iQ, Prius, RAV-4, Scion tC, Sienna, Venza; Lexus: CT200H, ES350, GS300/350, GS450H, IS250, IS350, LS460, RX350, RX450H

but not 4Runner, FJ Cruiser, Land Cruiser, Sequoia, Tacoma, Tundra, Yaris; Lexus: IS250C, IS350C, IS F, GX460, LX570

⁴Not Chevrolet City Express

⁵Not FR-S, xB (model discontinued after 2015).

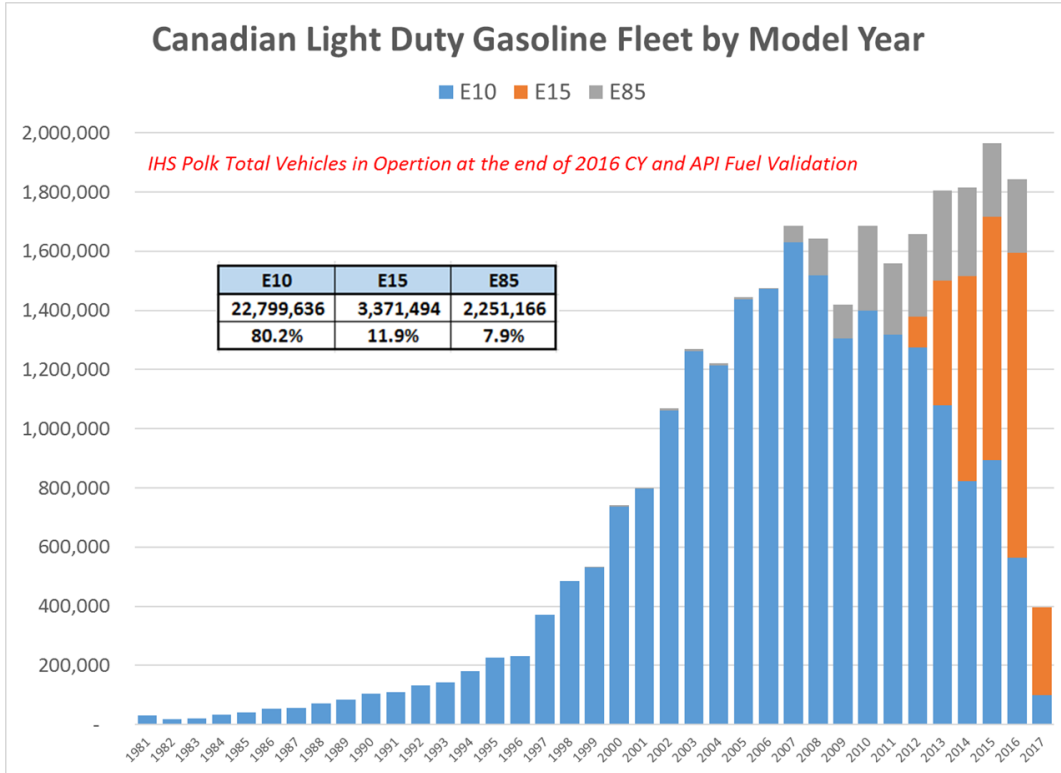
⁶Not Dodge Viper

⁷Not Hyundai Santa Fe, Kia Optima

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¹ <https://crcao.org/news/Mid%20Level%20Ethanol%20program/index.html>

For those OEMs who have certified their new vehicles to operate on E15 this is no longer a warranty issue but becomes a customer pay issue when vehicles, engines or fuel system components fail on legacy vehicles. Customer dissatisfaction and cost will no doubt become a significant issue for B.C. residents. Using the API data above and the “Total Vehicles In Operation” in Canada, an analysis was done to determine the percentage of light duty gasoline vehicles that are capable of operating on E10, E15 and E85. The results are shown below:



At the end of 2016 CY, approximately 80% of the light duty gasoline vehicles in operation in Canada are certified to on E10 blends, 12% on E15 blends and 8% on E85 blends. Use of fuels at blend that are higher than this runs the risk of engine, fuel system and emission system failures that will impact customers. Due to the average relative age of the B.C. fleet at 11 years versus all Canada which is 9.3 years, it is expected that the percentage of E10 certified vehicles will be slightly higher in B.C. than the 80% for all of Canada due to higher fleet age. By requiring fuel blends in excess of E10 the B.C. Government will be forcing miss-fueling situations on a significant number of B.C. customers and creating potential engine, fuel system and emission system risk for those customers.

Section 12: BioDiesel

Unlike ethanol the fatty acid methyl esters (FAME) content of biodiesel is dependent upon the source of the biodiesel blendstock. Cloud point impacts to the finished blend are dependent upon the nature of the FAME in the blend which will require different concentrations of kerosene to make the cloud point suitable for the season of the biodiesel being used. Fuel blenders will have experienced filter plugging and fuel waxing even with low concentration blends of B5 and under in the winter months. Care must be taken to ensure that the finished blend has the right operational characteristics for the season.

Many OEMs are offering B20 certified diesel engines but given the above issues with cold weather operation there are technical limits on the amount of biodiesel that can be used based on the

weather conditions. Beyond the cloud point issues one the key issues with biodiesel in the tendency for the fuel to break down in conditions of long storage and higher temperatures. Fuel quality specifications and proper housekeeping are required to ensure the fuel is fit for use by the customer. We trust our comments will be considered and are wish to participate in the consultations on this matter. Should you wish to discuss our submission, please do not hesitate to call me at 416.364.9333.

Yours sincerely,

A solid black rectangular box used to redact the signature of Yasmin Tarmohamed.

Yasmin Tarmohamed
Vice-President, Environment, Health and Safety