



**SMART FUELLING**

# INSIDER

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## A MESSAGE FROM **SMART FUELLING**

Just when it seemed as though winter might never end, spring is in full swing and summer is just around the corner.

While summers are short here in Canada, Canadians lead the field in squeezing as much fun and celebration as possible into three short months before fall arrives again. As Canadians, we also know that taking road trips to see friends and family and using A/C to stay cool on the road can decrease engine efficiency, rack up kilometres driven, and increase our trips to the pumps.

We need to make the most of our fuel-ups during the warmer weather if we hope to keep costs down. As always, we've got you covered! In this issue, we'll explore some tips to help you increase your vehicle's fuel economy, saving you money at the pump and helping the environment. We'll delve into some of the latest progress in the design and optimization of today's internal combustion engine (ICE) vehicles and take a closer look at how gasoline and electric vehicles stack up.

So, pour a coffee over ice and settle in! We hope you enjoy this latest issue, and as always, we look forward to your feedback.

**The Smart Fuelling Team**

*Smart Fuelling*

A MESSAGE FROM  
SMART FUELLING

5 WAYS TO SAVE ON  
FUEL THIS SUMMER

ICE, ICE BABY  
BY JOHN EICHBERGER

FIRING ON ALL CYLINDERS  
TO REACH CLIMATE TARGETS



# 5 WAYS TO SAVE ON FUEL THIS SUMMER

SUMMER IS HERE, AND WHY NOT SAVE ON FUEL? THESE TIPS WILL HELP GUIDE THE WAY



**1** Take advantage of the warmer weather and take your bike where you can. Mother Nature really took her time bringing the warmer weather our way this year. Now that it's here, why not make the most of it and bike to work, to join friends on a patio, or to the local beach? You'll save money on gas and GHG emissions for the environment, all while seeing the sights and catching some sweet rays.

**2** Remove roof and bike racks when you're not using them. While they're incredibly helpful when packing for a summer's camping trip or a trip to the mountain bike trail with friends, these accessories increase wind resistance, and will seriously undermine your fuel economy. Removing them in between excursions will result in significantly improved fuel efficiency.

**3** Know when to hold them and when to roll them. Nothing feels quite like motioning a wave with your hand outside your window as you cruise through your neighbourhood. Ditching the A/C for your drive through the city doesn't just create that Instagram-worthy story moment, it also gives your engine a break and boosts fuel economy. Just be sure to roll the windows back up before getting on the highway. At higher speeds open windows create resistance that require your engine to work harder than it should to maintain speed. While counter-intuitive, this is where using the A/C can save you money on gas. If you keep these rules in mind when you're travelling, you'll be able to play both cases to your advantage.

**4** High-octane isn't just for high test engines, it's for all engines. Europe and the UK are very densely populated countries with more vehicle traffic than we have here in Canada. To help reduce GHG emissions from the cars on their roads, they've created higher octane fuel blends that increase engine efficiency and decrease fuel consumption. While we don't yet have access to the same high octane blends from across the pond, we can choose higher octane blends while at our pumps for similar savings. High-octane fuel typically costs less than 3 per cent more than regular fuel, but delivers a 3 per cent or greater fuel efficiency. This applies to all cars, giving everyone the opportunity to gain higher engine performance.

**5** Driving an older car? Make that road trip with a rental. Renting a car might seem like an additional vacation expense you don't need to invest in, but if your vehicle is more than 10 years old it might not have the same fuel tech that your rental model would. The leaps in internal combustion technology and fuel efficiency over the last decade are significant. You might just find that it costs you more in gas to take your own vehicle than to rent one for your trip. You may even save enough on gas to treat yourself to a refreshment when you get there.



## ICE, ICE **BABY** | BY JOHN EICHBERGER

Alright, stop. Collaborate and listen. ICE (internal combustion engines) are here and they're on a mission. Like Vanilla Ice came under pressure from David Bowie and Freddie Mercury for "sampling" their technology, today's ICE vehicles are likewise under pressure from fuel economy standards and the unrelenting drum beat of electrification which threatens to steal their market. But don't count ICE out of the equation – there is a resurgence under way that should prove more fruitful than Vanilla's effort to shift from rap to hardcore rock, then ultimately to high-end house flipping.

In an era when all headlines extol the coming electrification of the transportation market, and many are claiming the ICE

is as efficient as it can get, in the labs and workrooms of the world's auto makers, engineers have been working diligently on new designs and optimization strategies to squeeze out a few more miles per gallon. And their efforts are delivering results, which is good news for consumers.

Because, even if electric vehicles (fully battery powered and without an accompanying ICE) can gain 30% - 40% share of new vehicles sold in the next 20 years, that still means 60% - 70% of new vehicles will be powered by some sort of combustion engine. The more efficient that engine, the better for consumers. And progress is being made.

### Here is a sample of what we are seeing:

- Mazda has announced the introduction in 2019 of Skyactive X – a spark controlled compression ignition gasoline engine. This system is designed to squeeze a gasoline-air mixture so tightly that it will auto-combust (like diesel fuel), delivering perhaps up to 40% greater thermal efficiency than a traditional spark-ignition engine. The reason a spark is used at all is simply to control timing to ensure that pre-ignition (aka knock) doesn't damage the engine. This technology has been a target for engineers for decades and it seems that Mazda has cracked the code. (I wonder if the designs were hidden in the Castle Anthrax?)

- Nissan has already introduced in some of its Infiniti models a variable compression ratio turbo engine. What does this mean? It means that an engine can modify the compression ratio of its operation to maximize efficiency under different operating loads and requirements. In other words, when the engine needs more power and performance, it will deliver. When it can cruise at a lower power level, it will do so. In fact, this engine can shift ratios from 8:1 all the way to 14:1. Nissan reportedly has been working on this engine for 20 years and has incorporated more than 300 patents under the hood of these vehicles.

- Auto engineers throughout the industry are playing around with intake valve timing to adjust the amount of fuel-air mixture introduced into the piston chamber to ensure that less energy is required (and less wasted) to complete the power stroke of the piston. Unfortunately, this results in decreased power and, when a driver needs to punch it, could yield suboptimal performance. So different companies are pairing such engine designs with either a turbo charger to restore power when needed or with a hybrid battery system that will boost power when needed.

- Other auto companies are hyper-focused on optimized engine design that would maximize efficiency when operating on a specific, higher-octane fuel. This strategy may require an adjustment to fuel production and distribution to ensure the appropriate fuel is available when these engines hit the market, but the strategy could result ultimately in a 15% - 20% efficiency boost when all enabled technologies are loaded. In addition, advancements in transmission design are yielding great benefits. My first vehicle was a 1974 Chevy Luv with a four-speed manual transmission.

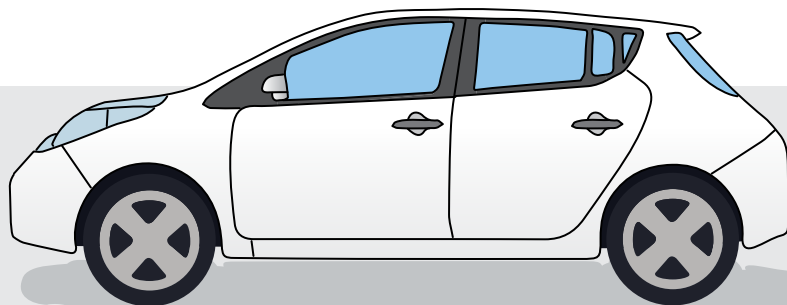
I have since had vehicles with five and six-speed manuals and five and six-speed automatics. Today, seven, eight and 10-speed automatics are becoming common options and continuously variable transmissions are getting better every year. Each improvement delivers greater efficiency.

What does this mean? In an age of repeated announcements by governments and auto companies relating to a full transition to an electrified market, you have to look at the details and the fundamentals developing behind the scenes. These announcements almost always incorporate a role for hybrid vehicles, which run on traditional liquid fuels running through an internal combustion engine. Advancements in ICE boost efficiency of these hybrid systems and can prolong the market life expectancy of liquid fuels.

Will the fuels market have to adjust formulations? Perhaps. There is a lot of momentum building behind a move to boost fuel octane to enable more efficient engine design, but some of the advancements I mention above are not dependent upon a higher-octane fuel. They deliver enhanced performance and efficiency using regular 87 AKI fuel, but I suspect we will have to figure out ultimately how to manage a transition to a higher-octane fuel.

Hence, while everyone is looking at the trends towards electrification and autonomous vehicles, there remain those who continue to crank out more efficient and higher performance ICE technologies, and that is very important. Because, no matter how much investment is made in the EV market, ICE are going to be here a very long time and these improvements will not only benefit consumers, they will contribute to a longer life expectancy for this technology.

***As Vanilla would say,  
"Word to you mother."***



# FIRING ON ALL CYLINDERS TO REACH CLIMATE TARGETS

Feb 08, 2018 | **Canadian Fuels Association**

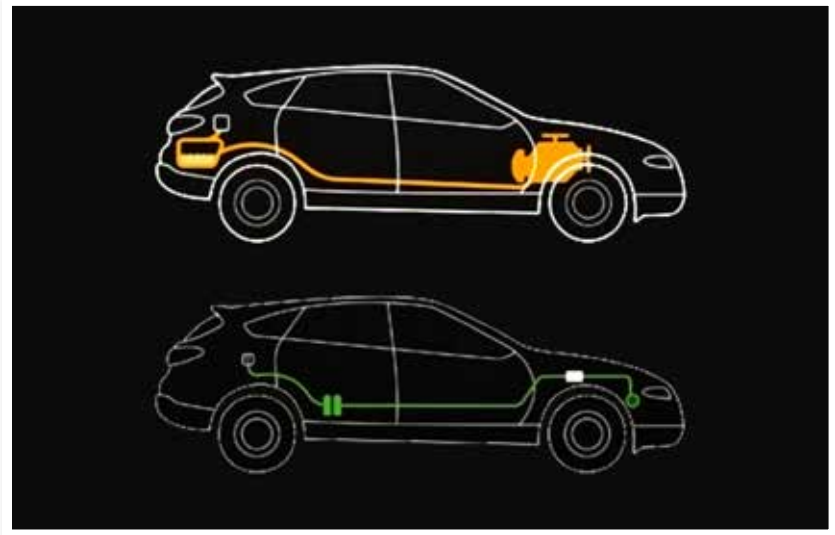
Electric vehicles are part of our transportation future. But they represent only a small fraction of today's vehicle fleet and new vehicle sales. We are years, perhaps decades, away from large-scale consumer adoption of electric vehicles as an alternative to conventional, gasoline powered cars.

So with major climate targets fast approaching and with policy costs adding up, we should be firing on all cylinders to find a solution (pun somewhat intended).

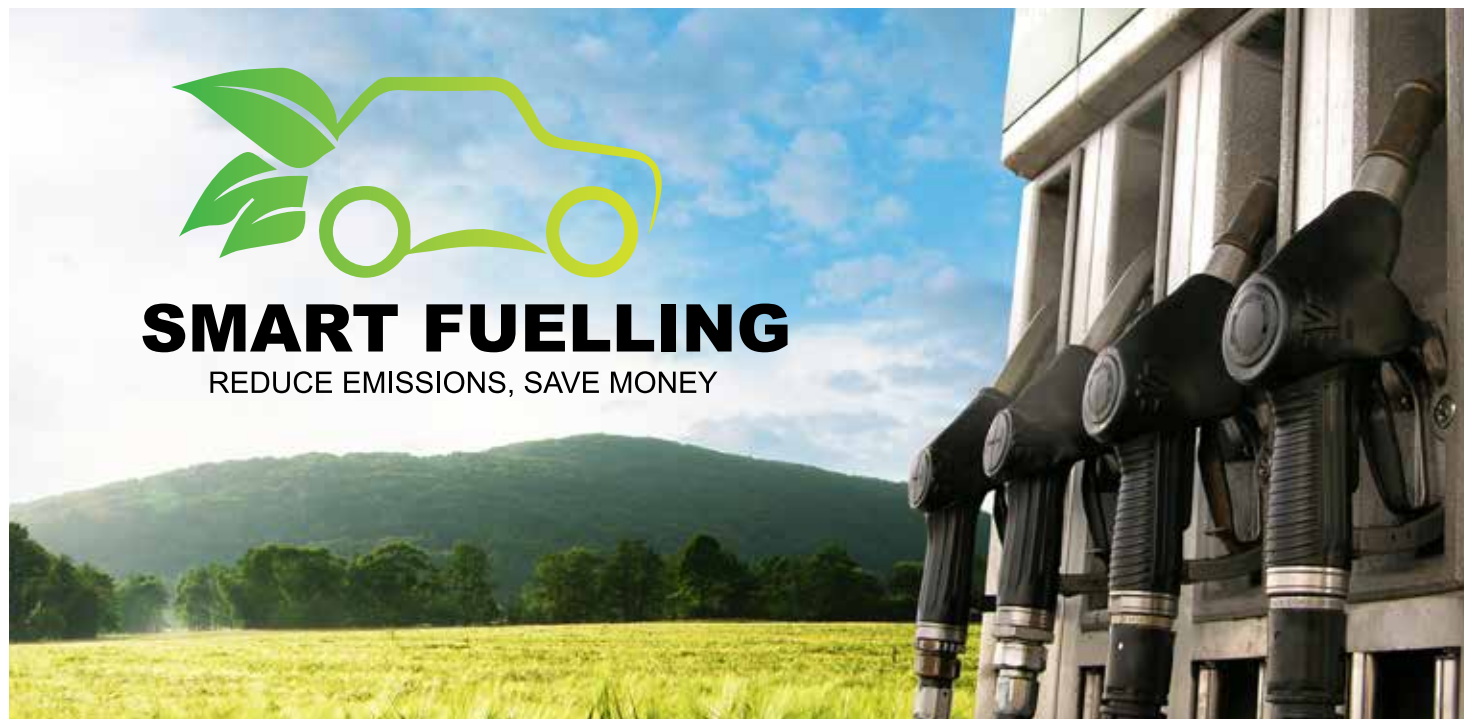
It might be hard to believe that an internal combustion engine car is the solution. It's the **cost effective**, **emissions efficient** and **consumer preferred** solution to actually meeting those climate targets in a timely fashion.

So while policy-makers seek quick wins and Canadians are driving off automobile sales lots in gasoline-powered cars more than ever, we've put together some of the differences between the two vehicle types. Of course they both have their benefits and drawbacks. For example, both gasoline powered cars and EVs **lose efficiency in cold weather**, but the difference is more significant in an EV. Do you drive a lot in rural areas? Think about refueling and charging options.

The **Canadian Fuels Association** is the official association for the petroleum refining, distributing and marketing sector and works to promote meaningful discussion around policy choices, their benefits and their unintended consequences. To read more about the article click [here](#).







## BECOME A PART OF **SMART FUELLING**

### **WANT TO JOIN IN OUR EFFORTS TO HELP CANADIANS IMPROVE THEIR FUEL EFFICIENCY AND REDUCE GREENHOUSE GASES?**

We are always looking for new industry partners and municipalities who want to inform and motivate consumers through Smart Fuelling. Whether it's a helpful fuel efficiency tip on a fuel pump, a handout at a gas station convenience store, or information on your website, we can all work together to create a better, cleaner tomorrow.

**Join West Vancouver and many other communities that have already implemented the program today! Call us at (613) 470-8555, email us at [admin@smartfuelling.ca](mailto:admin@smartfuelling.ca), or sign up to receive our updates on [smartfuelling.ca](http://smartfuelling.ca).**

We look forward to the opportunity to partner with you to set a positive precedent to reach Canadians everywhere!

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