Matrix was founded on one core principle – to do great work for our clients. We call it The Matrix Principle.

This principle is based on the belief that our clients deserve to be advised by highly skilled, passionate, and independent investment bankers who have an intense desire to fully understand the client’s specific goals and work diligently to achieve them.

After thirty years of building client relationships and advising on more than 300 engagements, we can truly say that our bankers have remained committed to, and guided by, The Matrix Principle.
Would You Like to Go For a Walk?  
The ICE is Not Dead Yet

BY JOHN EICHERGER, FUELS INSTITUTE

Let me begin with a question – how sick are you of hearing about electric vehicles? In the past couple of years, I would estimate that 82% (yes, this is made up and my go-to made up statistic) of the questions I get from people center around the potential rate of electric vehicle market growth. And I understand it. Every single headline seems to be declaring the death of the internal combustion engine (ICE) and the inevitable, rapid, disruptive rush to an electrified future. But what is really going on?

Don Rumsfeld famously talked about the known knowns, known unknowns, and unknown unknowns. He has been relentlessly derided for this, but it makes a ton of sense. We don’t panic about the things we know, we investigate the things we know we don’t know, and we lose sleep fretting about the boogie man in the closet we don’t know about. To an extent, this is sort of like the EV market – we know it’s coming, we are being told it’s coming fast, but we really don’t know what to expect.

So, let me set this topic aside for a minute with one statement – it is coming and EVs will represent a dominant position in the future, but that future is unlikely to show up tomorrow. I have written about this in IGM in the past, so take a look at my past columns for more detail or go to fuelsinstitute.org/media and check out our blog, The Commute.

But now, let’s talk about something that doesn’t make you want to curl up into a ball and hide in the corner. Like the old man in Monty Python’s “Holy Grail,” the ICE is not dead yet and quite frankly is ready to go for a walk.

After more than 100 years of engineering and manufacturing, some don’t think the ICE has much left to give – to these I say bull. In fact, according to WardsAuto, the Holy Grails of ICE design have been found and the efficiency of the ICE is gaining more momentum every single year.

**Proof 1:** 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?)

**Proof 2:** 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.

If these were the only things going on, I would say this is pretty incredible. But there is more. Auto engineers 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.

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 ICEs 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.

I do not discount that ultimately the market will be dominated by electric vehicles that do not rely upon an internal combustion engine and liquid fuels. But I disagree with those who believe that future is coming soon. Despite the hype and the rhetoric and the unrelenting beat of two coconut halves banging together, the ICE is not going away anytime soon. My rough estimate concludes that, even in the market delivers an incredible 20% annual rate of growth in EV sales, in 2035 EVs will represent about 32% of sales but only 8% of vehicles on the road. One might consider this just a flesh wound, especially when you consider the remaining 68% of vehicles sold and the other 92% of those on the road will be powered primarily by an ICE. There are many variables that can accelerate or slow this estimate, but I believe this is a solid place at which to start an evaluation.

Fuel marketers should pay careful attention to the pace of evolution within their markets and take advantage of opportunities to diversify their product offer to satisfy an ever-changing consumer. But the unknown unknowns are not as scary as some may have you believe. Whenever you read a headline that seems aggressive (in other words, most of them), look carefully to determine if the witch they are presenting is actually a witch or if someone just dressed up a woman with a false nose before you decide to throw your business into the pond. ★