2040 – The death of the internal combustion engine?

…hold your horses, literally

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Executive Summary

It might look fashionable but don't fall for all EV cars from 2040

Heard this all before

It isn't a big surprise to see national governments virtue signal over climate abatement. The UK swiftly followed French plans to ban the sale of petrol/diesel cars from 2040. However, let's get real. Government proactivity on climate change may appear serious but the activities of the auto industry are generally a far better indicator of their lobby power. As a car analyst at the turn of the century, how the excitement of alternatives to internal combustion engines was all the rage. Completely pie in the sky assumptions about adoption rates. In 1999 industry experts said that by 2010 electric vehicles (EV) would be 10% of all units sold. Scroll forward to 2017 and they are near as makes no difference 1% of total vehicle sales.

VW is revealing in its response

Volkswagen makes an interesting case study. After being caught red handed cheating diesel emissions regulations (a perfect example of how little VW must believe in man-made global warming) they were in full compliance at the 2017 Frankfurt Motor Show telling the world of their $80bn investment in EVs out to 2030, 300 new EV models comprising 3 million units in 25 years of which 1.5mn would be sold in China. 3 million cars would be c.30% of VW's total output today.

Fuel duties are big

We cannot ignore the huge tax revenues governments generate from fuel excise. Fuel duties in the UK are expected to fetch around £35bn in 2017 or c.5% of total tax receipts. In Germany that number is around €40bn, the third largest intake after income tax and GST.

Massive infra Needed

On top of this, massive electric infrastructure will be required in many countries. Not just installing more charging points but meeting higher electricity demand with new power generation to replace aging infrastructure and the push by many governments to install unreliable renewable energy. Governments relying on other countries for back-up power is fraught with risk. Yet it seems countries like the UK aren't properly prepared to meet the excess demand they are trying to force on the hand of consumers by loading a grid they can't sensibly ensure can be charged. Battery technology will improve but whether commerciality can be achieved is another question.

Self-driven cars and insurers are an issue

We should also think of how EVs, which are being pushed as the backbone of self-driven cars, affect the insurance industry and the auto makers. After-all if a driver puts his/her car into auto-pilot and the safety systems fail to avoid an accident which results in death/injury either of the driver, passenger or pedestrian is the auto maker at fault? This will require legislation to define responsibility. This will also need to be extended to the potential of 'hacking' autonomous cars where willful remote action could lead to deaths. Emergency service providers have made it clear that traditionally powered vehicles to function properly.

Cars need to meet customer utility not just be electric for EV's sake

SUVs still popular

What governments must also consider with car purchases is utility. Why is it that SUVs remain one of the most popular vehicle classes around? In the US, SUV sales have surged from 16.4% in 1980 to around 36% today. Could it be that the man who likes to sail needs a V8 Toyota Land Cruiser to haul his 7000lb boat. While he might like a Tesla Model S with 22" rims it can't manage even half of the Toyota's towing capacity. Could it be that a mother with 3 kids who often takes her parents on trips to the beach needs a minivan? Have they considered the single bachelor who wants a BMW sports car? Or the DINKs couple who want a Range Rover because they love to ski in the winter. In niche sectors, it may not be profitable for car companies to fill those segments with EVs.

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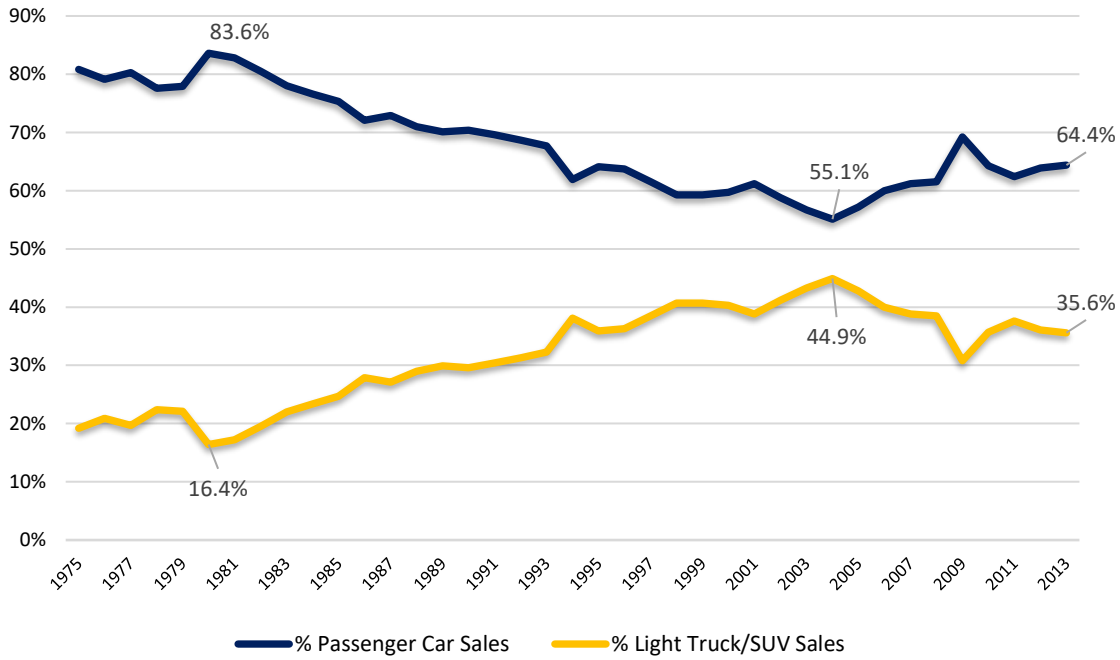
Fig.1 : Composition of New U.S. Light-Duty Vehicles by Vehicle Type



Source: www.afdc.energy.gov/data/

Has the auto industry been properly consulted?

UK & France Haven't consulted industry

Have the UK & French governments consulted the auto industry? It wouldn't seem so. Having a zero emissions target is one thing. Why not tell auto makers they need to get to zero emissions but give them complete technological freedom to hit those targets. If the auto makers see necessity as the mother of invention, who are regulators to dictate the technology? If an internal combustion engine can achieve zero emissions does that not meet the goal? There is a very important reason for this.

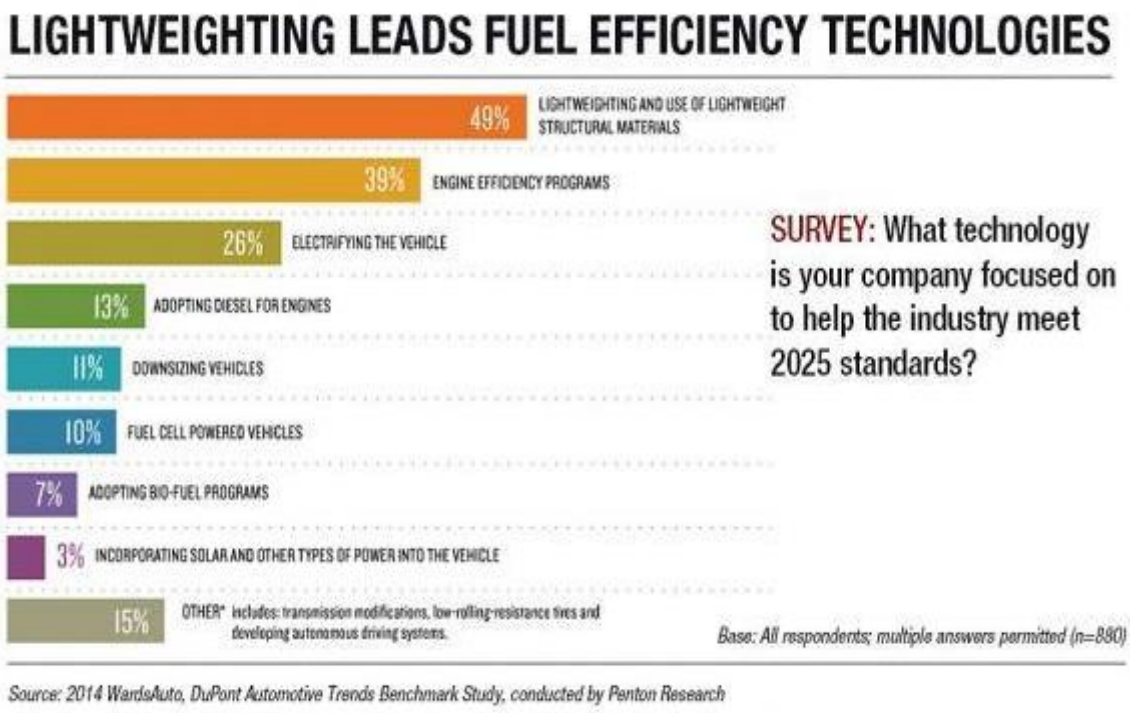
Auto DNA vital

Talk to an automaker in private and they will admit they are against full EV because it ruins the most fundamental part of their DNA - the drivetrain. When you read all the blurb on automakers' brochures what is the one area they can milk consumers? Power and performance. Mercedes can sell you a base model C180 for a little bit of profit and absolutely gouge out your eyeballs

for the top-end high performance C63 which will vaporize your wallet with the options list. Auto makers don't want to go full EV for this very reason. EVs will turn cars into the equivalent of an iPhone vs. a Samsung Galaxy. Brand and style with very little differentiation outside of packaging.

A 2014 study conducted by Penton Research produced this telling chart about how they aim to meet government fuel efficiency regulations by 2025.

Fig.2: What have automakers in the US been focusing on to improve economy



Weight reduction

As Fig.2 shows, automakers want to lighten materials to boost economy. Electrifying the vehicle ranked third. This also included hybrids. As this was an American survey it isn't surprising to see the low weight of diesels as a solution.

Daikyo Nishikawa

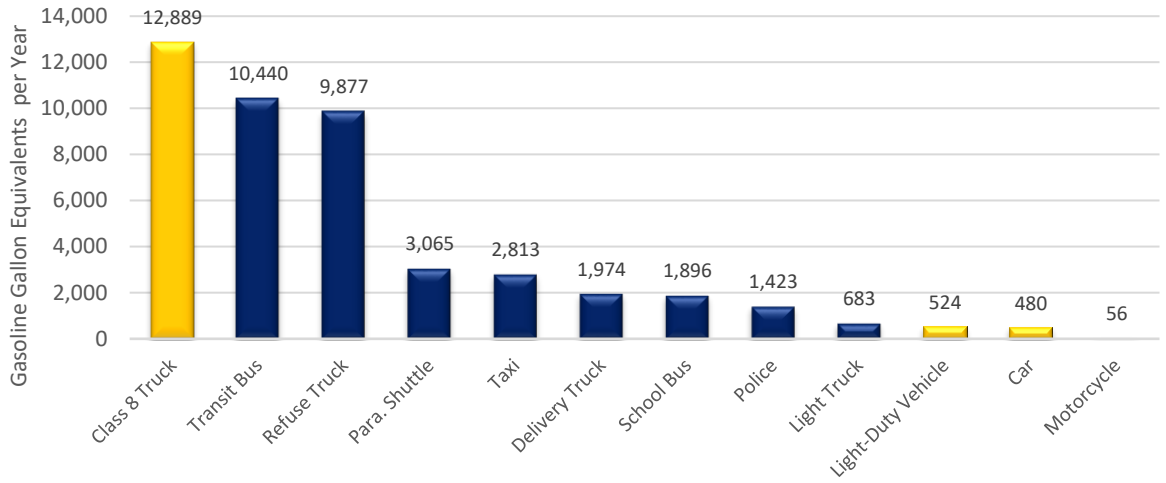
Companies such as Daikyo Nishikawa (4246) have seen strong growth driven by the shift toward plastic panels which are lighter and cheaper to produce. The Mazda Roadster is full of supplier's plastic panels for cost effective weight reduction. Daikyo Nishikawa has also managed to cut out the painting process by a technology that allows the paint to be impregnated into the plastic panel with finish quality properties as good if not superior to steel

Fuel economy – which vehicle is burning?

Fuel economy

Scroll toward to fuel economy. The Federal Highway Administration looked at average annual fuel consumption. Taking a simple sum of Class 8 trucks, annual sales which comprise around 1.5% of passenger cars, they consume 42% the amount of equivalent fuel. While US haulage distances are larger than those in the EU, the relative gaps to passenger cars is similar. Put simply trucks relative impact is 27x higher than automobiles.

Fig.3 :Average Annual Fuel Use by Vehicle Type



Source: www.afdc.energy.gov/data/

Sensible EV subsidies?

EV Subsidies are tax cuts for the wealthy

Take California's new $3bn plan to support EV sales - effectively a deeply Democrat state fritting away tax dollars to subsidize the wealthy. The poor chap who has to drive a 20-yo petrol pick-up truck because he can't afford a new one is probably paying taxes to subsidize the guy who pays him to mow his lawn to buy that Tesla. It is a serious question.

Removal hurts sales

Have governments considered that consumers are already clearly showing their belief in 'climate change abatement' by the cars they buy? When the subsidies were torn from Tesla in HK, sales went to zero while in Danish Tesla registrations fell 94%. Isn't that evidence enough of how these vehicles are only tax avoidance devices, not the action of deep seated ecologists?

A reminder of the risks of green subsidies in other sectors

Green failures

So before running for madder green schemes to save the planet perhaps governments should remind themselves of past failures. Moreover, when governments get heavily involved in subsidizing industries it generally results in disaster by creating massive oversupply like we saw in solar and wind industries. Spain perhaps provides the strongest evidence of this. Around 2004 it wanted to get 1GW of solar under its feed in tariff over 4 years. Instead it got 4GW in 1 year meaning its budget exploded 16x and it had €120bn in tax liabilities over the course of the

promise. In the end, the government reneged. So much for the assurance of government run programs.

Germany's failure in bio-fuel legislation last decade

Bio-fuel disaster in Germany

The German authorities went big for bio-fuels in 2008 forcing gas stands to install E-10 pumps to cut CO_2. However as many as 3 million cars at the time weren't equipped to run on it and as a result consumers abandoned it leaving many gas stands with shortages of the petrol and gluts of E-10 which left the petrol companies liable to huge fines (around $630mn) for not hitting government targets.

Kill it!

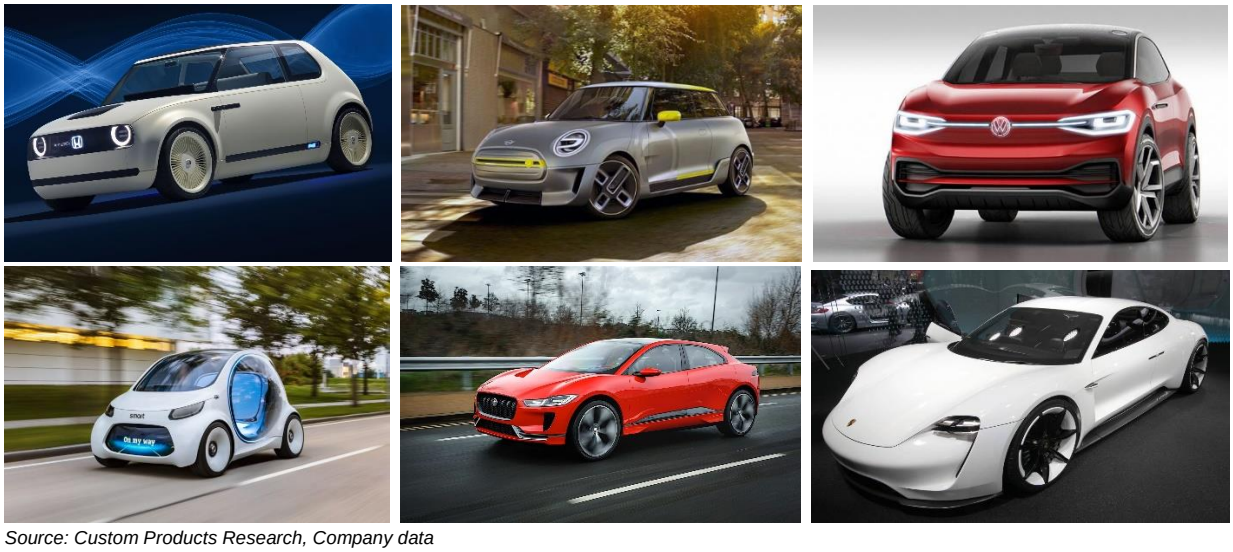
Claude Termes, a member of European Parliament from the Green Party in Luxembourg said in 2008 that "*legally mandated biofuels were a dead end…the sooner It disappears, the better…my preference is zero…policymakers cannot close their eyes in front of the facts. The European Parliament is increasingly skeptical of biofuels."* Even ADAC told German drivers to avoid using E10 when traveling in other parts of continental Europe.

The 2017 Frankfurt (Virtue Signaling) Motor Show

Virtue signalling in Frankfurt

The Frankfurt Motor Show this year was used to introduce a truckload of EVs across all brands to show automakers had caught the enviro bug.

Fig.4: Frankfurt Motor Show 2017 – roll out the EVs



Source: Custom Products Research, Company data

VW to be 30% EV by 2042

As mentioned earlier, VW said it aims to be 30% EV by 2042. That is undoubtedly a realistic goal when assessing production cost, development, infrastructure roll out and ultimately consumer demand. While the UK and France may have drawn a line in the sand, reality is that Westminster and Paris are at the mercy of the manufacturers and the supply chain to meet the ambitious target.

Our contention is that these targets get peeled back and pushed out. We have seen many delays in the US Corporate Average Fuel Economy (CAFÉ) standards. The U.S. Environmental

Protection Agency (EPA) and the NHTSA began the development of regulating greenhouse gas emissions from vehicles in 2007.

US delaying CAFE

The standard for passenger cars had stayed at 27.5 mpg from 1990 until 2007. In 2009, the government set a fuel economy standard of 34.1 mpg for cars and light trucks by 2016. In 2012, it set a new target of 54.5 mpg by 2025. Trump is looking to push out the April 2018 deadline to hit 49.7mpg and the 2025 potentially out to 2030.

A study commissioned by the Alliance of Automobile Manufacturers estimates the cost of compliance to EPA regulations is around $1,249 per vehicle.

Below we see the evolution of power trains in the US market in the last decade by number of new model introductions. Note that the EV slice includes the Plug-in hybrid EVs (PHEV). Hybrid shares have grown while petrol and diesel have shrunk relative.

Fig.5: 2006 SUV Model Breakdown by power unit

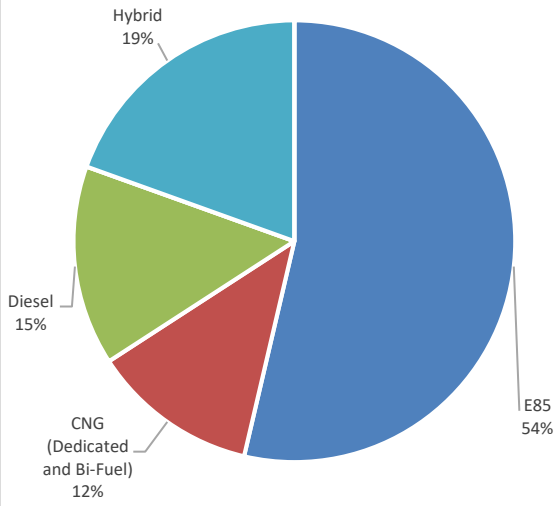
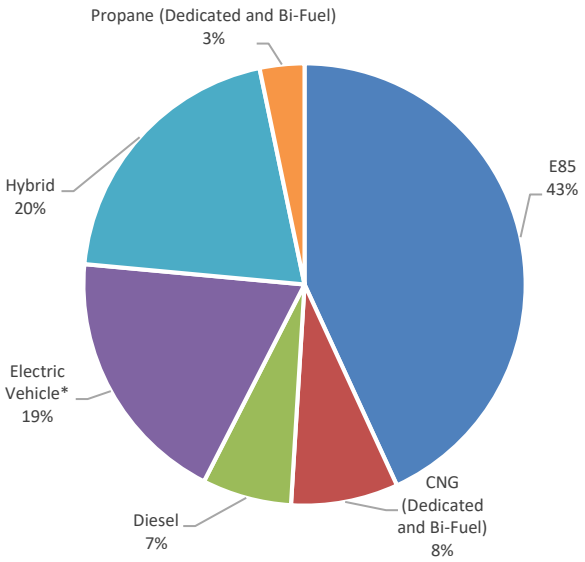


Fig. 6: 2016 SUV Model Breakdown by power unit



Source: www.afdc.energy.gov/data/

The dangers of autonomous driving

So much faith is put in the hands of computers nowadays but the idea of driverless cars is still fraught with danger. Car & Driver reported;

Dangers of autonomous driving

"*Researchers at the University of Washington have shown they can get computer vision systems to misidentify road signs using nothing more than stickers made on a home printer. UW computer-security researcher Yoshi Kohno described an attack algorithm that uses printed images stuck on road signs. These images confuse the cameras on which most self-driving vehicles rely. In one example, explained in a document uploaded to the open-source scientific-paper site arXiv last week, small stickers attached to a standard stop sign...using an attack disguised as graffiti, researchers were able to get computer vision systems to misclassify stop signs at a 73.3 percent rate, causing them to be interpreted as Speed Limit 45 signs.*"

Hacking danger

One step beyond tricking on-board systems as aforementioned, a full hack of a car has far more risky implications. NHTSA launched an investigation when Chrysler cars could be manipulated to hijack the brakes and accelerator. It took five years for Chrysler to fix the full takeover hack and required a 1.4 million vehicle recall.

Which then begs the question of ultimate liability for insurance companies.

Fig. 7: tricking the driverless detection systems

Source: University of Washington

Insurance payouts versus auto maker negligence

Firestone/Ford

It is not too hard to envisage the scenario where a sophisticated hack of an autonomously driven vehicle causes death or injury. We do not have to look back far to the Bridgestone/ Firestone-Ford Explorer tyre blow-out scandal which ended up in the deaths of over 200 people. Besides the negative brand image associated with the recall and investigation it is quite possible to see insurance companies refuse accident payouts due to the flaws in the auto-pilot systems.

Damages

Car companies could end up being on the hook for billions if these vehicles are compromised. While the software in the cars can always improve there is no reason to suggest the hackers get more creative and sophisticated.

Big Brother

Big brother is watching

While one might think autonomous vehicles are the future, consider the privacy implications. Your car will be remotely controlled. Your data of where you travel, when you travel and what you do will become available.

Do people wish to have such tracking in their lives? Were such data hacked, thieves could use the data to work out when you were out of the house, where you shop, bank and where your kids go to school. Think of how many post to social media where they are going on holiday and what not. Many are already loose with public information to then have applications and systems that monitor your every move.

Even if it sounds like conspiracy theory, this is something few have considered.

Emergency Services are not convinced by EV

Ambulances need diesel power

What about emergency services vehicles? Have these governments considered the impact of having reliable heat exchangers (from combustion engines) to power lifesaving equipment in ambulances? It is easy to believe politicians have had no such discussions with the people that are most affected. An Australian paramedic made the issue clear,

Why do they need?

"*We have Webasto heaters in our cars in the colder areas. Running off the diesel they can operate 24/7 if needed. If we don't have them some of our equipment doesn't work like our tympanic thermometers, the blood glucose reader and then there is the problem of having cold fluids in the car. This is a problem if we are giving these IV because we can make a patient hypothermic if it's cold. Then there's just the general environment inside the cab. It needs to be warm in winter.*"

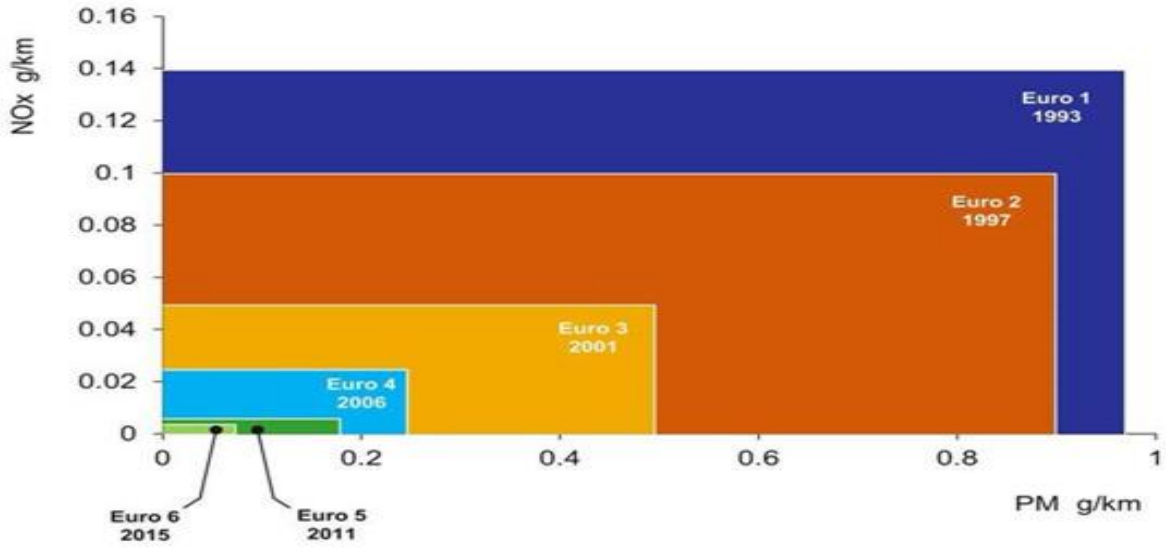
What about LCVs? Will light commercial vehicles be exempt? Just watch the auto makers classify their SUVs as LCVs and dodge the rules. The Hummer is a perfect example of this. It was so heavy that it managed to be excluded from the passenger vehicle qualifications on fuel economy. So auto makers did not need to include it in their CAFÉ calculations.

Why is government forcing adoption of EVs?

Forcing EVs! Why is gov't meddling in technology they have no idea about?

It stands to reason that to question those with the least idea on the technology being the ones trying to dictate the future. The zero emissions appeal of EVs is an effective virtue signaling device to voters. However if we look at Euro emissions regulations introduced since 1993, one can see the progress made in the last 20 years. Euro 6 started in 2015. For diesel particulate matter, emissions are 97% down on Euro 1 (1993) and NOx down by 95% over the same period, Fig.8.

Fig.8: Diesel emissions cut – Euro 1~6 – 97% lower in 20 years



Source: Delphi

So much progress in 20 years

By sheer virtue of the scale of emissions reduction in 20 years for internal combustion engines, why not charge the auto makers to hit a zero emissions target by 2040 in any form they choose provided it is met. All auto makers should be given the power to go full electric of their own volition. Why not allow the spirit of innovation to come to the fore and allow auto makers to defend their brands in ways where they take the risk?

In 1999 I had the same discussion with Beru AG (now Borg Warner), a German diesel glow plug maker. The CEO said that in 20 years the ability to cut emissions by almost 100% would be achievable. Indeed he was correct.

Taking into account life cycle costs of EVs

Unfortunately depending on what a country's actual electricity generation mix is the charging of EVs can have a larger impact on total emissions.

Life cycle costs in EV vs petrol

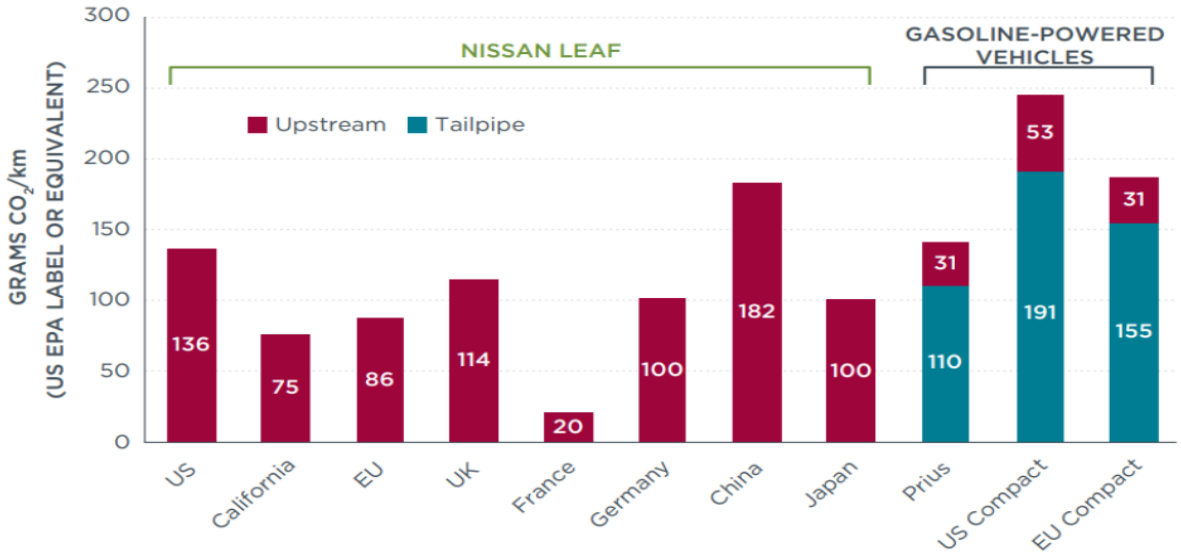
The IVL Swedish Environmental Research Institute was commissioned by the Swedish Transport Administration and the Swedish Energy Agency to investigate lithium-ion batteries climate impact from a life cycle perspective.

The report showed that battery manufacturing leads to high emissions. For every kilowatt hour of storage capacity in the battery generated emissions of 150 to 200 kilos of carbon dioxide already in the factory. Regular EV batteries with 25–30 kWh of capacity will result in 5 metric tonnes CO2, which is equivalent to 50,000 km driving in a regular, fuel-efficient diesel vehicle

Another study by the International Council on Clean Transportation (ICCT) showed that depending on the power generation mix, an all EV Nissan Leaf in the US or China was no better than a 2012 Prius. Countries with higher relative nuclear power generation unsurprisingly had

lower CO_2 emissions outcomes for EVs. By deduction countries with higher shares of coal or gas fired power negated much of the 'saving' of an EV relative to gasoline power.

Fig.9: Electricity generation mix impacts on CO2 saving with EVs



Source: ICCT

Electricity Prices & Infrastructure

Impact on grid

This is a sticky point. When the UK announced it was following France in the zero gasoline/diesel directive by 2040, the concern of being able to power up to millions of EVs (from the 90,000-odd now) and the impact on the grid rose to the surface.

15~40% extra stress on grid

Some industry pundits have argued the UK will need a range of technologies to manage the projected jump in power consumption by 15% in overall demand and spikes of up to 40% at peak periods. Renewable energy sources (including wind, wave, marine, hydro, biomass and solar) made up 25% of electricity generated in 2015. The UK aims to generate 30% of its electricity from renewable sources by 2020 in line with EU guidelines.

Changes in the grid mix

Britain is staring at the prospect of capacity issues in the early 2020s as old nuclear reactors are decommissioned and remaining coal-fired plants are phased out by 2025. Hinckley Point C will add around 3.2GWh to the grid. Up to 50 terrawatt hours (TWh) could be needed to charge all the EVs expected by 2040. While some argue that charging EVs overnight alleviates much of this fear the reality is most people charge their iPhones when they need it with little or no thought to others. If you wish to charge your EV and the grid is at risk of collapsing, how will the government regulate this? Will they mandate rationing? Enforce peak power pricing?

Government controls on power?

Import Export Electricity model

The UK electricity network is currently connected to systems in France, the Netherlands and Ireland through cables called interconnectors. The UK uses these to import or export electricity when it is most economical. In 2015, the UK was a net importer from France and the

Netherlands with net imports of 13.8 TWh and 8.0 TWh respectively which accounted for 5.8 per cent of electricity supplied in 2015. Total net exports to Ireland amounted to 0.9 TWh.

Problems with renewable

The growing problem with the push for renewables as a larger part of the mix is the paradox of loading more power consuming elements onto the grid (i.e. EVs) and looking to accommodate it with systems that have a proven inability to provide reliable baseload power. South Australia is a perfect example of this.

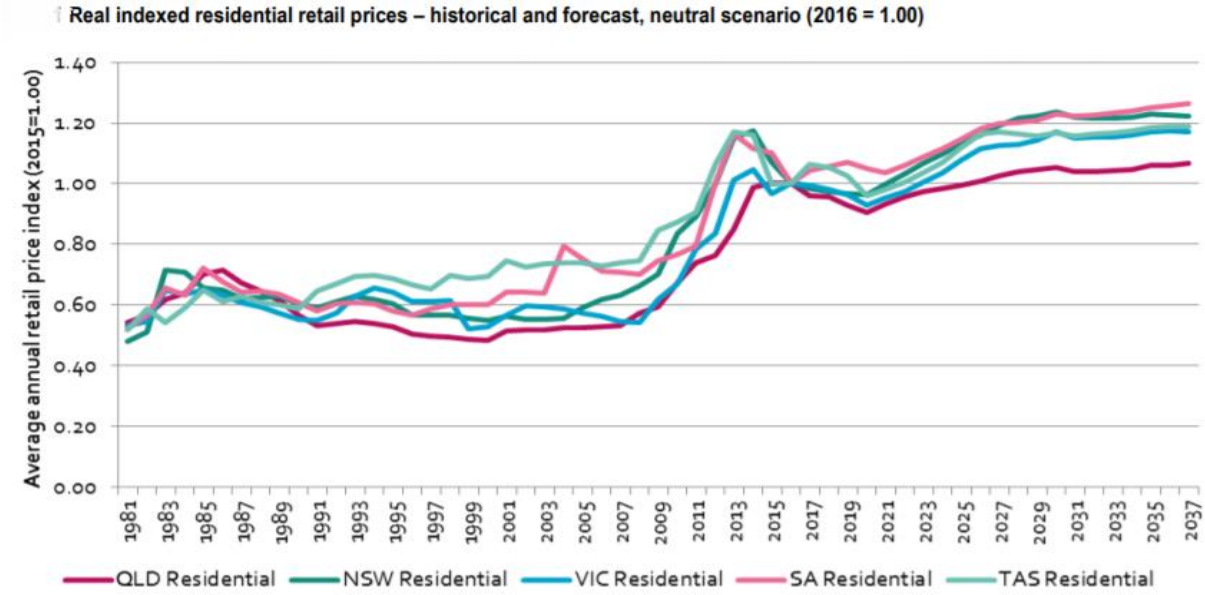
The sorry tale of South Australia

By pursuing a 40% renewables energy policy South Australia has suffered multiple blackouts. It has relied on the neighbouring state of Victoria to provide backup baseload power from its Hazelwood coal fired plant. However Victoria has now closed Hazelwood meaning South Australia will be forced to spend around $600mn to install new gas-fired capacity to offset the gap in supply capacity and demand. It will also add a $100mn battery plant to provide the state with 90 seconds of back-up power in the event of a blackout.

The folly

South Australia has the world's most expensive electricity prices, the highest unemployment rate in the country and the slowest growth. The irony is that while the gas generation is being built, diesel generators burning 80,000 litres of diesel per hour will provide the backstop until its operational. Fig.10 shows the sharp rise in Australian electricity prices as more renewables have been added to the grid

Fig,10: Progression and forecast of residential Australian electricity prices



Source: Jacobs International

Power shortages?

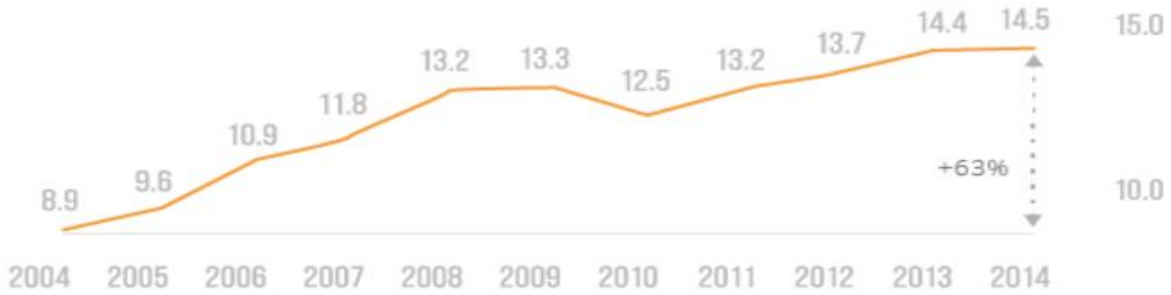
At some point governments will be forced to realise that in order to guarantee a pledge of 100% EV sales from 2040 it will require very sound policy on the generation front to combat the risk of power shortages. Relying on other countries to provide alternative power could prove a fatal flaw in the 2040 deadline. The construction of new energy capacity is never an overnight affair. The location, the energy source, the local neighbours, the size of the output and the people and materials to construct it all play a part. From start to finish, a decade is not an unreasonable

time frame yet if countries like France are relied upon to import electricity any policy change on their side can have very damaging side effects.

Upward pressure on prices

In short we have governments deliberately loading a grid at the same time it is making it far less reliable. This will have to play a part in a 2040 solution. In any event electricity prices are likely to rise putting further stress on households.

Fig.11: Progression of household UK electricity GBp/KWh (2004-2015)



Source: OVO Energy

UK electricity prices up 63% in a decade

In the last ten years the real price of electricity in the UK has risen by 63%, This is before EVs enter the electricity grid in earnest.

In any event rising electricity prices drives down the relative economic rationale for EV ownership.

Battery Technology Advances

Battery technology advances

Of course we cannot rule out advancements in battery technology which by deduction will offset any prices hikes in electricity by greater range. There is high anticipation for Toyota's solid state battery technology which in theory will speed charges, improve the performance of the per cell power stack and reduce materials. Such advancements would also weigh on the aforementioned electricity grid considerations but the question will still come down to commerciality, the ability to access raw materials and gear the supply chain to meet such demand.

Charging Infrastructure

Charging infrastructure

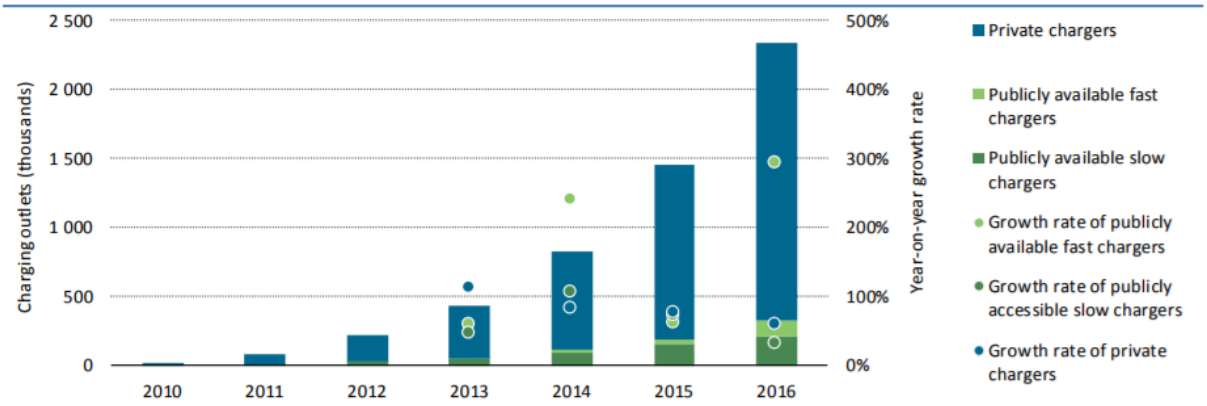
The roll out of fast chargers is growing. Where to install these 'charge stands'? Traditional petrol stations will be marginalised to serve a larger proportion of commercial vehicles. That could mean that local gas stands go out of business or require a major overhaul in operations. If charging times take 20-30 minutes, cycle time will be poor.

Pricey

It should not surprise that the faster the charge time the more expensive the initial outlay costs. The latest high end fast EV chargers can cost over $250,000 per unit.

According to the International Energy Agency (IEA) EV charging outlets surpassed 2 million in 2016. Electric cars still outnumber public charging stations by more than six to one, indicating that most drivers rely primarily on private charging stations.

Fig.12: Global EVSE outlets, 2010-16



Note: Private chargers in this figure are estimated assuming that each electric car is coupled with a private charger.

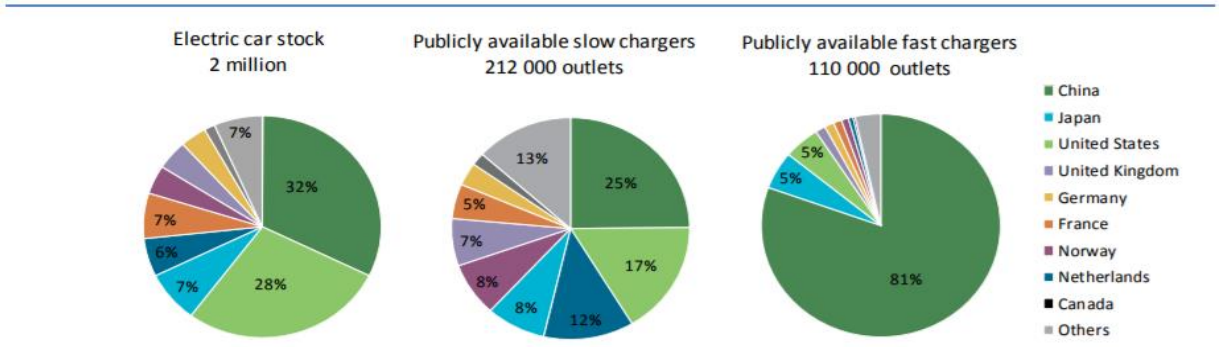
Source: IEA

The IEA stated in its 2017 report that,

Rollout of EV chargers

"The growth of publicly accessible chargers accompanies the increase in the number of electric cars on the road: the growth rate in the number of publicly accessible chargers in 2016 (72%) was higher, but of similar magnitude, to that of the electric car stock growth in the same year (60%). The higher rate of growth for chargers than electric cars is consistent with the need to deploy chargers as a prerequisite for EV adoption and the nascent nature of most of the electric car markets.…Publicly accessible EVSE growth was primarily driven by the rapid increase in the number of fast chargers, largely attributable to China, where fast chargers grew sevenfold to nearly 90 thousand units.31 Even when China is not considered, the growth rate for publicly accessible fast chargers in 2016 was still greater than publicly available slow chargers…"

Fig.12: EV stock & publicly available EVSE outlets, by country and type of charger, 2016



Source: IEA

China by 2020

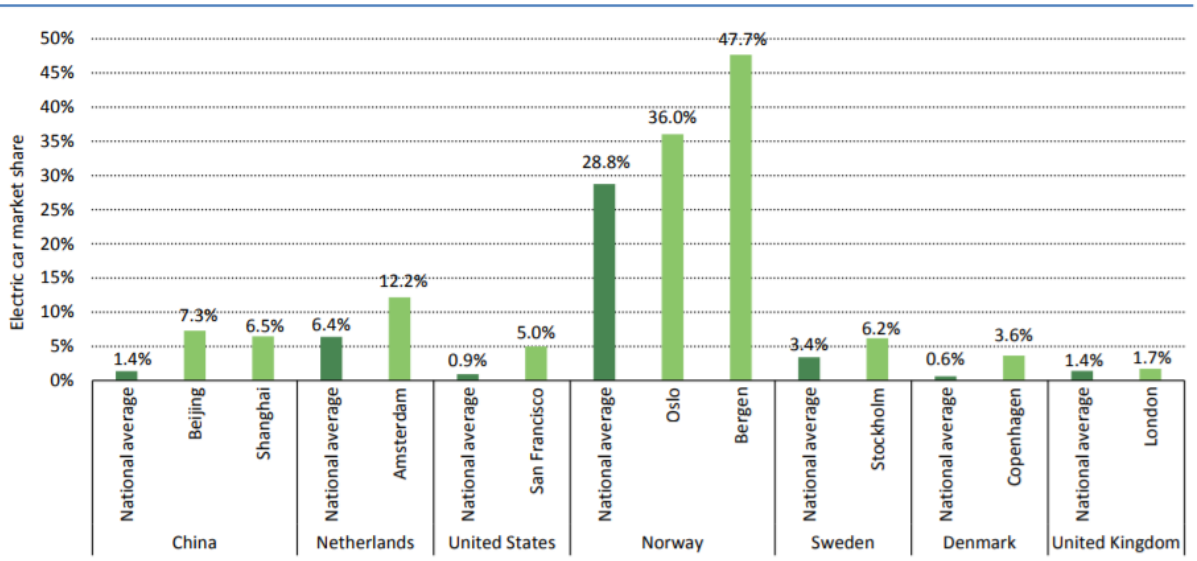
By 2020 China aims to deploy 4.3 million private EV charging outlets, 500,000 public chargers for cars and 850 intercity quick-charge stations, among other targets. The EU Directive on the Deployment of Alternative Fuels Infrastructure (EC, 2014) required EU member countries to define electric charging point targets for 2020. France has stated its ambition to deploy 7 million charging outlets by 2030.

France by 2030

EV cities won't work in regions

The IEA makes the claim of using EV cities to drive the adoption. While in theory larger city centres are subject to greater restrictions of access, parking and congestion zones, the idea that a rural town copying the program of a big city would unlikely result in similar adoption rates.

Fig.13: EV city policies that drive EV adoption



Source: IEA

In its conclusion the IEA noted,

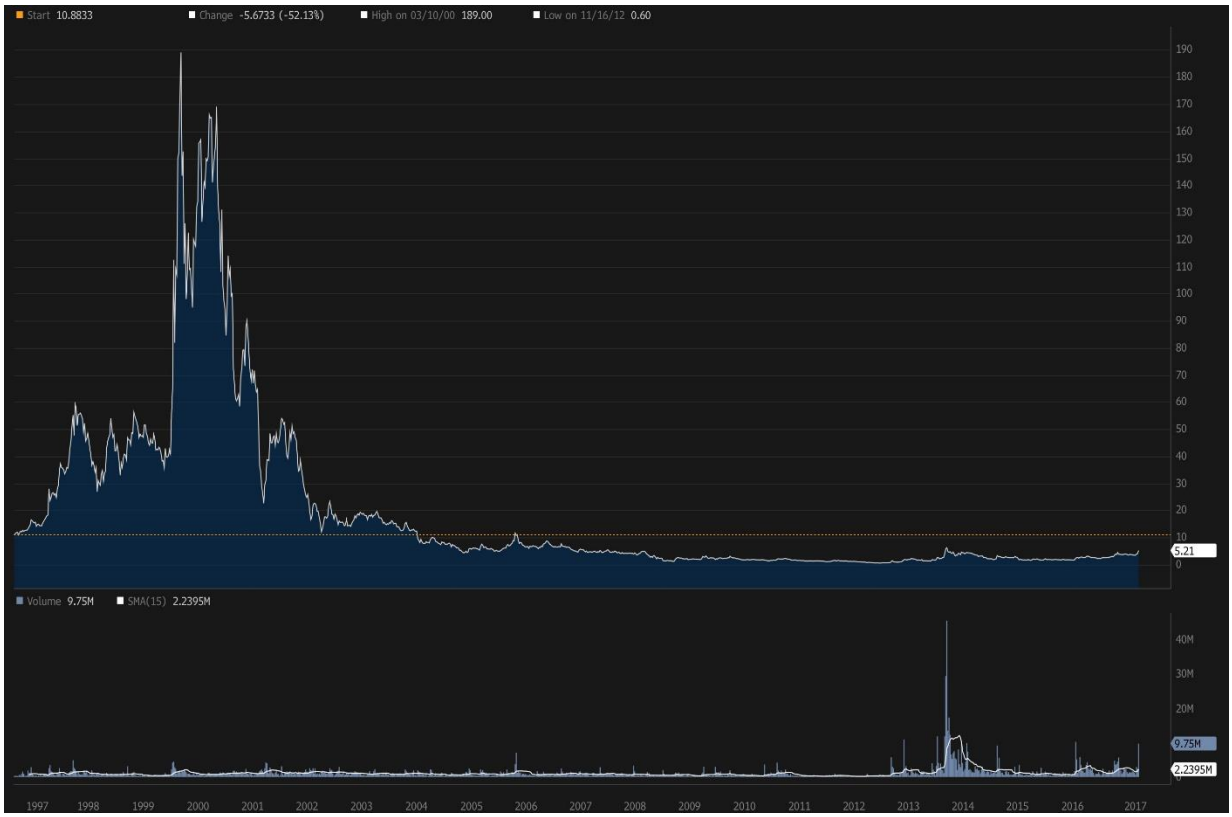
Very wide estimate ranges

"In the next 10 to 20 years the electric car market will likely transition from early deployment to mass market adoption. Assessments of country targets, OEM announcements and scenarios on electric car deployment seem to confirm these positive signals; indicating that the electric car stock may range between 9 million and 20 million by 2020 and between 40 million and 70 million by 2025."

Gov't policy set against educated guesses

Regardless of the adoption rates, it is worth nothing that governments are setting policy against estimates that are wider than an aircraft hangar door. Therefore investment decisions in the basket of EV related companies is likely to be a risky investment. EV related stocks have done exceptionally well to date but as ever when reality dawns, the downside is a gaping chasm. A look at the history of Ballard Power in Canada is a good yardstick for looking what happens when the wind is taken from a theme's sails.

Fig.14 – Ballard Power – a history of EV hope that failed to eventuate



Summary

Car industry employs 9% of workforce

EVs are coming. There is no point trying to ignore it. The question remains how rational setting targets such as 2040 are achievable. The auto industry employs around 9% of the workforce (directly and indirectly) so it is a powerful lobby group despite past failures and bail outs. If auto companies tell governments that the supply chain needs longer to catch up we will see this 2040 target slip to 2045 or 2050. Supply chains don't end at the gate of the end supplier but right down to the capacity and investment in raw materials procurement, the intermediate refiners and packagers. All levels of the supply chain have to be on board.

DNA vital

Nonetheless we must also accept that consumers have vastly different needs and auto makers must make sure they can make products that fill the market segments profitably. Most importantly car makers' drivetrain DNA is a vital component of their brands. EVs will do serious damage to this defining quality which will turn profitability back toward distribution networks and scale efficiency.

Energy policy is flimsy

Electricity generation and energy policy will be bigger swing factors in ultimate hard targets on the sales of EVs. While making optically appealing eco-policies look good in the eyes of the electorate, those same people will turn on politicians in time if these schemes end up costing them far more in terms of their daily consumption other than their driving habits. Rolling out new charging stations to meet demand is a moot point given the wide range of predictions of how big or small the market may end up being.

Renewable energy unreliable

The expansion of unreliable renewable energy sources as a percentage of total generation adds unnecessary risks into the EV equation. We have too many examples of the poor implementation of energy policy which gullibly relies on optimistic assumptions and the goodwill of neighbours we have no control of.

Insurance risks

The advent of automated driving has the potential to open a whole new can of worms. The insurance market will feel the urge to blame accidents on faulty technology (not faulty humans) and expect consumers to get their claims covered by the manufacturer.

Euro 6

Let automakers decide

Finally governments have got to allow industry decide how they achieve emissions regulations. In 20 years Euro 6 has proved that emissions can be cut 97%. What is to say in the next 20 years that auto makers can't drive that to zero? If car makers want to be a differentiator all they need do is fight the battle of internal combustion with zero emissions. Why are amateurs in technology (government) dictating to the professionals on what consumers may or may not want? Governments, for all the good will in the world must look at their involvement in renewable energy back at the turn of the century to remind themselves how disastrous their policies were in bankrupting so many companies that over invested in promises that were later reneged on.

Await the lobby groups

EVs are here to stay but to this author 2040 is nothing more than an idle promise by which time those politicians proposing it most likely won't be in office. Await the delays as the lobby groups explain the harsh realities to the law makers.

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