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12/2019

What can the use of
alternative means of
propulsion do to help attract
people in the countryside to
use them in the future?

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Independent Inquiry (ADAD6001)

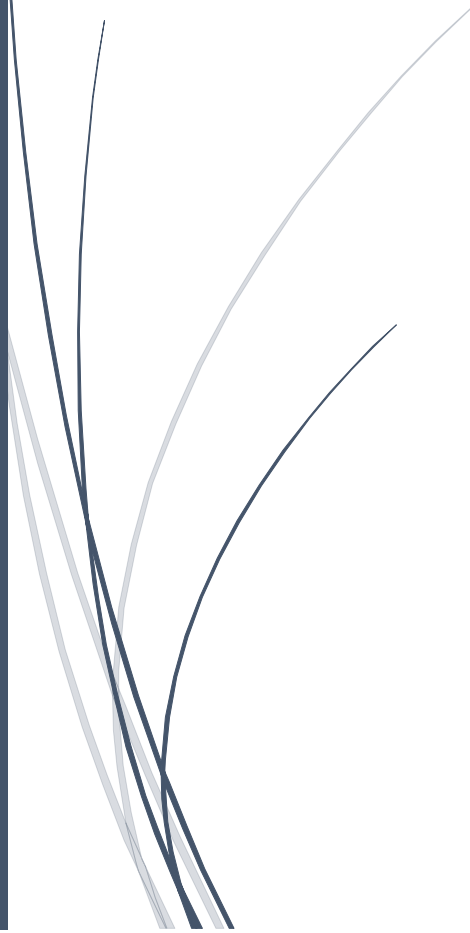
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Contents

Contents

Page 1

Introduction

Page 2

Chapter 1 – Where we see alternative propulsion at the moment?

Page 2-5

Chapter 2 – What are the predicted up-coming propulsion systems for the future?

Page 6-9

Chapter 3 – How would they attract people in the countryside to use them in the future?

Page 10-13

Conclusion

Page 14

Bibliography

Page 15-16

Introduction



According to a United Nations Article, from their Department of Economic and Social Affairs (<https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>), “Today, 55% of the world’s population lives in urban areas, a proportion that is expected to increase to 68% by 2050”, and in an ever increasing polar bear caring world and restrictions on pure fossil fuel car production from 2040, what can done to make an Eco-friendly car more appealing to the rest of the 32% who are predicted to still be living in more Rural Areas in the future?

And don’t worry. There will be no mentioning of ‘The Climate Emergency’, or any name drops of ‘A certain young girl’...

Chapter 1- Where we see alternative propulsion at the moment?



but well hated by people with eyes. And so, over the last 10+ years the Mainstream rivals have caught up, with 2019 said to be the dawn of the electric car.

To answer this question, we have to look a little bit back in recent history. Back in 2008 a small start-up company called Tesla set out to make an attractive Electric sports car based off a Lotus Elise, which kick started the whole of the Electric car craze. Before then, there were a few electric and electrified cars out there like the Toyota Prius and the Gee Wiz which might have been commonly found in cities,

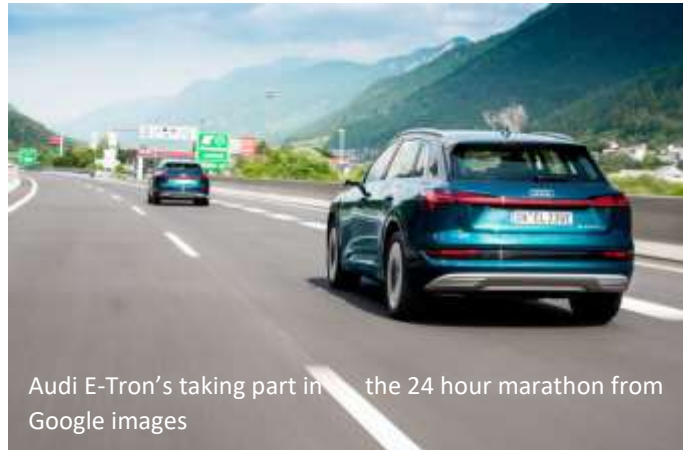
The one of the main problems with electric cars is the Driving Range (not the golf sort of driving range), especially when you have to wait for the car to charge up that takes much longer than a usual petrol of diesel car to fill up. But that hasn’t stopped an Auto Express journalist from driving

1000 miles through 10 countries in 24 hours in a carefully planned endurance test in the new Audi e-tron. Vicky Parrott puts in P22 of Auto Express Magazine;

“The e-tron’s 150 kW maximum charging rate is more typical of most premium electric cars, and we were about to find out what that charging speed – good for around 100 miles in less than 15 minutes – did for cross continental travel. Numbers are one thing though. Actually covering such a huge distance without getting stranded courtesy of a plug-less autoroute is a far better and more colourful test of where the electric car and its charging lifeblood stands.”

Although in the end she missed her target of 1000 miles in 24 hours by 100 miles, but it proved that “not only how effective a long-distance car the e-tron was, but also how effective the charging infrastructure can be. However, I’d like to emphasise that ‘can be’”.

However, it proves that the range and charging networks are getting better by the day, meaning that those of us who live in the countryside can do long distance drives, but that they still aren’t as reliable or as quick as filling up a petrol tank.



Audi E-Tron’s taking part in the 24 hour marathon from Google images



Lotus Evija from Google Images

So as 2019 sets to launch a load of EV’s, what are the best electric cars out there at the moment? Well if High Performance is your thing You have the choice of the Rimac Concept 2, Pininfarina Battista, or the Lotus Evija. All with a ludicrous amount of power with the Lotus claiming on their website

(<https://www.lotuscars.com/model/evija/>), to produce

over 2000 PS, which in comparison to a typical 1.4 petrol powered Volkswagen Golf with 140PS, makes it cool, expensive, but unnecessarily powerful for a road car.

If you look at the other end of the spectrum and into the more affordable scale you also have things from the tiny Renault Twizy, Nissan Leaf, Peugeot 208 e, Volkswagen ID 3, and finally after a 2 year delay, the Tesla Model 3 (the Tesla of which we will get back to later). All of



Volkswagen ID 3 from Google images

these are aimed more to get people to follow the trend to move from your normal fossil fuelled cars to an environmentally friendly equivalent. For example this Volkswagen ID 3 pictured above, is supposed to be the All Electric size equivalent to the regular Volkswagen Golf, to help reduce air pollution in big cities as seen with the ULEZ (Ultra Low Emission Zone) in London, and the up-coming Diesel Ban in Bristol as seen in the news recently (5th November 2019). A lot of these cheaper electric cars make sense if you live in a city where you don’t ever really need to leave the city, London as a good example, but to make them cheaper most of them don’t quite have the battery range to do long day trips, so don’t work as well in the countryside as of yet if you need to pop

across counties quickly, especially when they are less efficient at higher speeds on long motorway trips. So, what are the best All-rounders if you lived in the countryside?

So, if you want an all-rounder electric car expect it to be a saloon or SUV only at the moment. You have the Tesla Model S and X, Jaguar I Pace, Mercedes Benz EQC, the aforementioned Audi E-Tron Quattro, and the new Porsche Taycan. These offer more space but leave a massive gap between the cheaper city runabouts, and the hyper car's, but also offer a premium price tag, often costing around £10,000 more than their normal petrol equivalent's and start from £60,000 to around £170,000 which makes them just too expensive to make a lot of people go for one in more rural areas over a regular fossil fuelled variants. For example, why would you go for a £70,000 entry level Audi E Tron Quattro, when you can get a mid-spec, slightly larger, Audi Q7, 50 TDI Quattro, in S line trim, for a little less with an 85-litre fuel tank.

While on paper it doesn't make this level of electric cars seem worth it, let's have a look at one of the most anticipated electric cars this year, The Porsche Taycan Turbo S. This executive German saloon newcomer maybe the pricier option, but you can't complain too much that you aren't getting the performance for the price, with 750PS, and 0-60mph in 2.8 seconds. And with it using a 2 speed gearbox at the back,



actually makes it a fairly sensible motorway muchner with a 256 mile range (still not enough for to get from Swansea to Suffolk though). In a review from Top Gear Magazine, Jack Rix puts;

'First opportunity to floor it from a stand still and "Weeeeeeeeeee!" – that's the car, not me – but a momentary concern that I may have given myself whiplash. The initial kick is violent, borderline unpleasant, and simply doesn't relent'

'Pouring it down a Swedish B-road, I'll admit that I miss pulling paddles. It's part of finding your rhythm down a fast road: two yanks and a bit of brake, turn in, feed the throttle back, I change up, change up, repeat. Without it, you find yourself arriving at bends faster than you think and, assuming you're not in a tree by this point, slamming the throttle further than you'd normally dare.'

Having been in the passenger seat of a Tesla Model S P100D (a slightly slower but older rival to this), and not having driven it myself, I feel that this gives a very good description of driving one. It proves that there is evidence to use the electric motor in the future, but that it kind of lacks the involvement to the driving process. The chances are that if you live in the countryside, you tend to want to have a bit of fun on a nice, open, twisty section of road nearby. So how does driving an electric car compare to over driving a petrol car? Well in a later Article in the same Top Gear Magazine, Ollie Marriage puts the Tesla Model 3 Performance up against a similarly priced Mercedes Benz A45 AMG Hot Hatch. Marriage Puts;

'Earlier this year we pitched a Model 3 against BMW's M3 and tested the objectives (acceleration, braking, laptime). To no one's great surprise, the Tesla won. Now its time for the subjectives: is an electric sports car as much fun as a performance petrol?'

Bearing in mind that he was testing both of these out on a racetrack and not on the road, but in the end Marriage puts;



Merc A45 and Tesla Model 3 from Top Gear

'I find the Tesla's acceleration dull. It's the same every time. That's not exciting. In the Merc, you have to work with the powerband, think about when you want to up and downshift, listen to it. The interactivity, that's what I miss about electric cars, the feeling the car isn't just a tool for a job, but a companion, a partner.'

This clearly shows that electric cars clearly don't have the character, the feeling, the passion that a lot of keen drivers want in a car, especially if you lack the fun factor on a fun twisty road. And I know I'm not the only one who looks for that in a car, especially when that bond between yourself and your car gets stronger out in the country where you can feel a playful side a little more.

After writing this section, I wanted to go out and see what an electric car was like to drive from a personal perspective, so I went to try out the Nissan Leaf, to see what it was like to drive in comparison to my own DSG, 1.4, petrol powered Seat Leon FR, around Swansea. I found it makes sense if you lived around town as it made every throttle input effortless with no noise to it, but the weight of the batteries were obvious in the corners with the light, numb steering inputs. It also had no feeling of character and just felt like a tool to get from A to B. Getting back into my Leon and it a little sluggish without the instant acceleration, but it also felt more agile and playful, with all the controls having a much heavier feel to them with sportier steering inputs. So if I had to choose between a new version of my Leon FR at £24,000 or an electric Leaf at £29,000 I'd go for the petrol powered Leon everyday for the type of driving I do. But if I lived in a city it would make much more sense to get the Leaf, but I don't.



Nissan Leaf Nismo Concept from Google Images

It also turns out that in the long term owning an electric car is more harmful to the planet than first anticipated. In an article for the Daily Mail Online (<https://www.dailymail.co.uk/sciencetech/article-5880609/Tesla-electric-cars-not-greener-petrol-ones-according-UK-data.html>), Vanessa Allen puts;

'They are marketed as being among the world's most environmentally friendly vehicles. But Tesla's may be as bad for the planet as their petrol and diesel equivalents. Analysts found the amount of greenhouse gas used in building a Tesla and generating the electricity to charge it was no different to petrol cars. Battery-powered cars such as the Tesla are charged with electricity from power stations, and half of Britain's power comes from coal and gas.'



Electric car charging spot for Google Images

This proves that the electric motors themselves aren't the harmful thing, but its where we get the power to charge the batteries up properly that makes them more harmful in the long-term ownership of the cars. So, should we start looking at alternative ways to power our cars that doesn't rely on Old Infrastructure as much?

Chapter 2- What are the predicted up-coming propulsion systems for the future?

What about Petrol Electric Hybrids?

Hybrids have been around for over 20 years now. Simply put as a two-in-one of an earlier seen electric car and a normal internal combustion engine car too, most commonly seen in the form of the hateful Toyota Prius. But they have come a long way since, and now different companies have developed it in very different ways. However, hybrids aren't just for economy cars anymore as even Ferrari have just launched their first hybrid production supercar, the SF90 Stradale. This might be a big V8 powered supercar, but it does have the capability to run on just electric motors alone. Ferrari say on their website (<https://www.ferrari.com/en-EN/auto/sf90-stradale>);

'A high performance Li-ion battery provides power to all three motors and guarantees a 25-kilometre (15.5 mile) range in all-electric eDrive mode, using just the front axle. When the internal combustion engine is turned off, the two independent front motors deliver a



Ferrari SF90 Stradle from Google Images

maximum speed of 135km/h (84mph) with longitudinal acceleration of <0.4 g. Reverse can only be used in eDrive mode which means the car can be manoeuvred at low speeds without using the V8. This mode is ideal for city centre driving or any other situation in which the driver wishes to eliminate the sound of the Ferrari V8.'

This shows that even the high performance brands are getting ready for areas like London's Ultra Low Emission Zone (ULEZ) and starting to bring out supercars that can go around these areas without polluting quite as much as their fully internal combustion siblings, but crucially not forgetting about driving pleasure and fun behind the wheel when you want to have fun outside of the city. The other joy with having a hybrid is having instant acceleration from the electric motors whilst you are waiting for the engine and gearbox to spool up and react which is also why the high-performance companies are going down this route.

A lot of other high-performance companies have been doing this for a little while, like Porsche, McLaren, Polestar, BMW, with Mercedes Benz and Aston Martin about to come out with theirs.

Having driven a Lexus RC 300h F sport myself, before writing this dissertation as I have looked around a lot as I was in the process of buying a new car. This also uses the same technology of the Prius but in a sportier body. I can see the perks in this method, but nothing can get away from the weight factor. Yes, you can drive around in a fully electric mode, but only for a short while, and then the extra weight of having to lug around the batteries, an engine, and a fuel tank, makes it way less economical than a Lotus Elise. It might be seen as more environmentally friendly, but in the long run it works out worse for it.



Lexus RC F-Sport from Google Images

What about Supercapacitors?

Recently Lamborghini have released the Sian which has a new energy stage system called a supercapacitor (not to be confused with the Flux Capacitor from 'Back to the Future'). According to a Carbuzz Article by Roger Beirmann, from (<https://carbuzz.com/news/new-lamborghini-patent-spells-the-end-for-batteries>);

The patent relates to a new synthetic material that will form the basis of supercapacitors going forward. The new material was created by a team working under Professor Mircea Dinca from the MIT Department of Chemistry, based on the "Metal Organic Frameworks" concept. The result is a family of materials whose molecular structure is ideal for producing electrodes for high-performance supercapacitors in future, maximizing surface area while keeping mass down. In turn, this improves energy density, and according to the patent documentation, the new technology can improve energy density by up to 100% compared to any technology currently on the market. That means double the efficiency of the equipment found in the Lamborghini Sian, meaning that 808 horsepower as currently derived between the 6.5-liter V12 and 48-volt electric system is merely the tip of the iceberg. Of course, the bulk of that output is generated by the V12, which has been tuned to deliver 774 hp with 34 hp provided by the electrical system. However, the benefits of supercapacitors lie in their reduced mass compared to comparably-sized batteries, meaning with little to no wait penance, we could easily see a future Sian with an extra 70 hp boost while retaining its current weight.



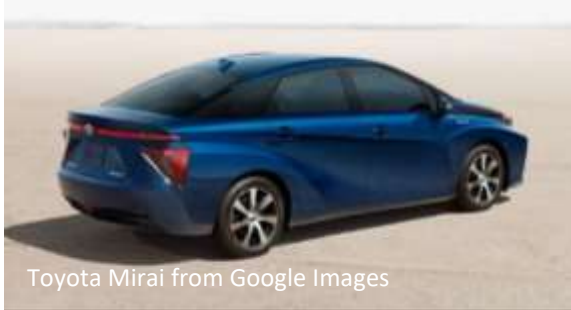
This means that Supercapacitor's are being developed by some of the best engineers and scientist's in the USA, but don't work that well yet. Although they are very early in development currently, they still show potential to act as a lightweight and more powerful battery equivalent for the future. So, in 30 years' time, Battery electric cars might possibly be a thing of the past where supercapacitors have replaced the batteries. But whether it can be seen as a viable alternative to a battery we will have to wait and see.



Lamborghini Sian from Google Images

What about Hydrogen?

Hydrogen cars have also been around for a little while, but just haven't been seen on the roads due to lack of infrastructure. Hydrogen really first started just over 10 years ago back in 2008 with the Honda FCX Clarity. But with only a range of 77 miles, and a huge lack of infrastructure, and only a total of 48 units sold in the US between 2008-2015, it's easy to say it was a sales flop. But there are



Toyota Mirai from Google Images

still companies making Hydrogen Fuel Cell vehicles today. Toyota currently make the Mirai that are used in London as private hire taxis. In a Motor1.com article, (<https://www.msn.com/en-gb/cars/news/hydrogen-powered-toyota-taxi-fleet-passes-million-mile-mark-in-london/ar-AAJsySg?ocid=spartanntp#image=AAJsmri|2>) James Fossdyke puts;

'The four-door saloons, run by private hire firm Green Tomato Cars, use hydrogen fuel cells to create electricity for their electric motors, providing zero-emission motoring with fill-up times comparable with those of petrol or diesel cars. Green Tomato has been running cars since 2015, although it only had two vehicles on a trial basis until the beginning of 2018, when it took on another 25 Mirai's. Over the next four-year period, the vehicles have travelled for a combined total of more than a million miles, which Toyota claims have saved 206 tonnes of Carbon Dioxide (CO₂) emissions. That means each Mirai has saved 7.6 tonnes – or four times its own body weight- of CO₂ from entering the atmosphere.'

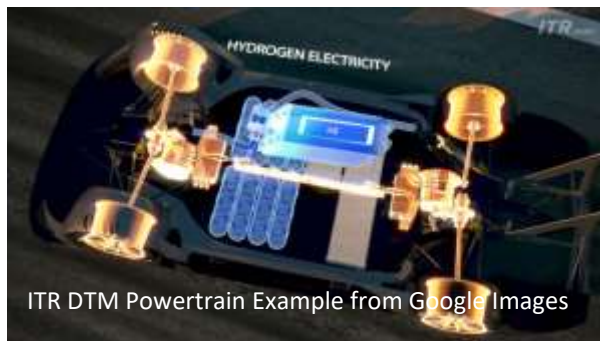
Although these figures are impressive, and the only emissions from these hydrogen cars is effectively pure distilled water, the Mirai is not exactly much of a looker as seen above. And at a cost of £62,500 I don't think most people interested in spending that much would willingly buy it with looks like a blobfish. But instead be more likely to look at the Hyundai Nexo for about the same price tag. And when Hyundai claim on their website (<https://www.hyundai.co.uk/new-cars/nexo>); 'A five minute fill-up takes you up to 414 miles. That's London to Sheffield and back again' as well as '1 hour of driving a Nexo = 25.9kg of purified air. That's clean air for: 42 people for an hour.'

With claims like these it should make Hydrogen Fuel Cell cars a "No Brainer", and not just in cities, but the biggest problem is still the lack of infrastructure. There are only 11 hydrogen pumps in the UK currently, with most of these in and around London, and the nearest one to Swansea is on the outskirts of Swindon (105 miles each way from SA1 waterfront campus). So even though it is a huge possibility, the infrastructure just isn't there still unless you live in London or Southern California.



Hyundai Nexo from Google Images

So, this fuel source might not be working out for road use currently, but could it work very well for use on a racetrack. Well DTM (a German Touring car race series that takes place over Europe) promoter ITR recently unveiled a concept for the future of the series. This can be explained by an article on the Top Gear Website (<https://www.topgear.com/car-news/electric/holy-heck-dtm-just-unveiled-1000bhp-electric-touring-car>) by Vijay Pattni;



ITR DTM Powertrain Example from Google Images

'The idea is carmakers would enter things that look like their road-going counterparts – just like current DTM. Sorta. They'd be built using a carbon fibre monocoque as a base, and feature either a battery or hydrogen power packs. The overall concept imagines "large industrial robots" to not only replace all four wheels in a pit stop, but the battery / hydrogen tank mid race too. Because over 40mins of literal bumper

to bumper action, more power would be required. The headline 1,000bhp figure is quoted as being available "for brief periods", but 200mph? So, who's up for a very professional, international motorsports platform that spits out bonkers 1,000bhp land missiles at each other for 40 minutes? Yeah, thought so.

It shows that if a major racing series like DTM is tempted with this then it might be able to bump up Hydrogen fuel cell popularity, especially if it sounds this good, and it should make the hydrogen infrastructure investment speed up...



Audi RS5 DTM car from Google Images

What about Gas Generated EV's?

Recently at the 2019 Los Angeles Auto Show Infiniti hinted at its insight into its electrified future. In a different Carbuzz article from (<https://carbuzz.com/news/infinitis-electrified-vehicles-wont-need-to-be-plugged-in>) Karl Furlong puts;

'Elaborating on customer-readiness for a full-on EV, Tim Franklin, the Director of Product Planning for Infiniti America said: "Folks aren't really ready to make major adjustments to their lifestyle to accommodate a plug-in vehicle or EV. This gas-generated EV gives us an avenue to deliver the experience without really interrupting their day-to-day life."

Infiniti's gas-generated EVs (an official name for the powertrain that's still in the works) will be for people who aren't ready to go for a full-on EV, but who still want to experience the efficiency gains and unique driving experience that electrification can offer. The system's gas engine generates electrical power stored in a battery, which in turn is transferred to all four wheels via two electric motors. Of course, this means no charging is necessary.'

Although this is very early days from the hint from someone high up in Infiniti, it's still not that clear how this will exactly work as it is still being developed. But they are definitely right about the fact that most people don't want to change their day-to-day life because of their cars. So, although we may have to wait and see how this particular one comes along, it could work if it doesn't go the way of the Hydrogen Fuel cell, even if it might not be quite as eco-friendly as it still relies on polluting natural resources.



Infiniti Concept Car from Google Images

Chapter 3 – How would they attract people in the countryside to use alternative fuelled cars in the future?

What are the current policies in place at the moment?

Well, in 2017 the government announced that they were going to ban the sale of New petrol and diesel vehicles in the UK as part of the Paris Agreement, alongside a £255,000,000 fund to help local councils tackle emissions in their areas. And it's not just the UK doing it, France and a few other European countries also have a similar target to ban the sale of current conventional fossil fuelled vehicles by similar dates as well. In a BBC News article from July 2017 (<https://www.bbc.co.uk/news/uk-40723581>), there are visual diagrams showing what types of vehicles were currently the most polluting and how small the numbers are for alternative fuel vehicle sales in comparison to petrol and diesel rivals. In the article they put;



Car Pollution from Google Images

'The AA said significant investment would be needed to install charging points across the country and warned the National Grid would come under pressure with a mass switch-on of recharging after the rush hour.'

Simply when a well-established agency like the AA come along and say there are likely to be problems, it usually means the ministers sorting it all out has overlooked something fairly major in the short term, in order for the claims to come into effect in the long run. But luckily there's at least 20 more years to go till that deadline. So at least there plenty of time to work on it between now and 2040.

So what are the mainstream car makers doing about it if international governments plan on banning them? Well, Volvo are claiming on their website (<https://www.volvocars.com/uk/about/human-innovation/electrification>) that;

- 'By 2025 50% of our cars will be fully electric'
- 'By 2025 we will have one million electrified Volvo cars on the road (mild hybrids / plug-in hybrids / pure electric'
- 'By 2025, we aim to achieve climate-neutral manufacturing operations'



Volvo V60 T8 Hybrid from Google Images

With claims like this, it proves Volvo are trying to ramp up the timeline a lot faster than a lot of other countries are aiming for, and show that Volvo as a company are trying to be a step ahead of most of the mainstream rivals, especially when they are now offering hybrids in all of their current production cars. Although a lot of the other mainstream companies are now pledging very similar quotes but with slightly later targets.

Of course in London there is now the Congestion Charge Zone, which charges extortionate amounts if you want to drive into a certain area of Central London for the day, but on top of that there is the new ULEZ (ultra low emission zone) which will charge you £12.50 in a car or £100 in a lorry or bus over 3.5 tonnes. That's if your car does not meet ULEZ standards. It means if you have a 2011 2 litre diesel family estate car you are not permitted to enter the zone as it makes too many pollutants, but you can go in with a 6.5 litre V12 petrol powered Lamborghini Aventador SVJ, and just pay £12.50 to get in. So, after thinking about it, makes no sense how a big thirsty supercar is less polluting than an economical sporty family car. But luckily if you drive an electric car then you don't need to pay to get into it at all. It works out as a very good deterrent for polluting the centre of the capital, but they might need to research on what cars should and shouldn't be allowed in.



Congestion charge zone sign from Google Images

Bristol have also have simliar plan's as they are planning on taxing only Diesel cars from a small area of their city centre as well. A differnet BBC News article from 11th June 2019 (<https://www.bbc.co.uk/news/uk-england-bristol-48597162>) explains it best;

'Plans to improve air quality in Bristol could see all diesel cars banned from a central area between 07:00 and 15:00.

It is one of two options being considered by the city council to reduce pollution. The second looks at running a clean air zone in the most polluted areas which would see charges for buses, taxis, light goods and heavy goods vehicles.

The city has already twice missed government deadlines for providing details of a clean air zone. The authority is considering a local scrappage scheme, improvements to buses and taxis and local traffic interventions in the most polluting areas'



Car by Clifton Suspension Bridge from Google Images

This seems to be the only city in the country taking this measure at the moment, but it is likely that a few more cities might be following suit later down the line. It looks like diesel cars are all getting the blame for all the air pollution in cities in the media, especially scince Volkswagen's emmissions scandal (otherwise known as Dieselgate) back in September 2015.

Most recently a consultation went live on the www.gov.uk website that is still running till the 14th January 2020, with the plan for Green Numberplates for ULEV's (ultra low emmission vechiles). On the website (<https://www.gov.uk/government/consultations/introduction-of-green-number-plates-for-ultra-low-emission-vehicles>), they say;

'The purpose of introducing green number plate is to:

- provide a UK-wide mechanism enabling people to spot and differentiate vehicles based on their environmental impact

- help inform road-users and normalise the idea of clean vehicles on our roads, encouraging a shift to cleaner vehicles
- help local authorities to identify ULEVs and bring in local incentives for electric vehicles'

Other rumours going around is that the use of a green numberplate might also allow access to bus lanes in busy areas like London as well, as they have a similar scheme in Norway at the moment where they can on permitting routes. But whether this actually goes ahead is another thing.



Green number plate example from Google Images

What sort of policies might work out in the countryside?

Well, obviously something like the London ULEZ wouldn't work out in the countryside, as it would cause a lot of anger having to spend £12.50 every day you use your car, even if it was just to go to the shops. And in the countryside, cars are pretty much a lifeline. Green number plates won't do a thing either as Bus Lanes are pretty much non-existent apart from in the main market towns that currently get used more by cyclists than buses themselves, at least in Ipswich.

So, what could work then? Well, I personally think that Tax cuts to business's that have charging spaces for electric cars in their car parks, as it would help increase the number of charging stations around and help the switch over to electric cars. But also, a requirement should be that all existing and upcoming petrol stations should have Hydrogen fuelling facilities. This would also help lower the amount of CO2 entering the atmosphere. As I feel that Electric powertrains are a good replacement



Fuel Pump from Google Images

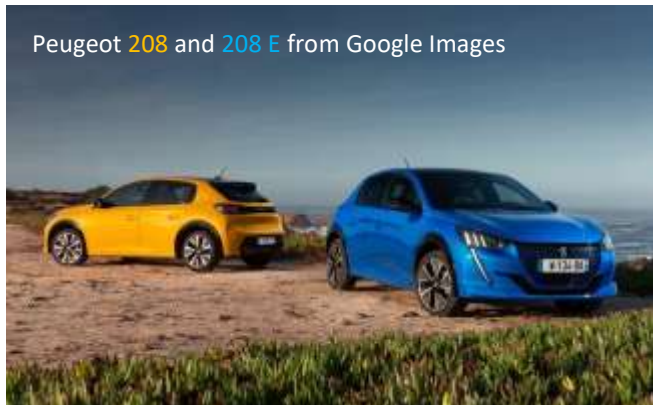
for petrol, due to lack of range and ease of use for short journeys, and that Hydrogen powertrains are a good alternative to diesel as they have similar range to electric cars but they are much more convenient to fill up. This gives people a choice of what way they want to go green as battery electric cars don't always work out best for everybody's lifestyle's, just like petrol and diesel have their own benefits, But I'll go on about that later.

But sadly, the incentive from the government has lacked recently, as previously there was a £5,000 grant that was given towards the purchase of zero emissions vehicles. But that has now gone down to £3,500 according to the government website (<https://www.gov.uk/plug-in-car-van-grants>). This would definitely help persuade more people to go greener if these grants went back up, even if their popularity is much higher now than when they started it.

What features from the powertrains themselves might persuade someone to go for them in the countryside?

When it comes to electric cars, they are very efficient around town and have been available for a while, and now have the infrastructure to take them seriously. So seriously that now some car makers are making some electric cars alongside their fossil fuelled equivalents as not to alienate the customers who might not want a quirky, futuristic looking car. They have the benefits of being quiet, efficient, and the usability of a smartphone. But like a

smartphone, they have the problems of charging times, and depreciating battery. For instance, 'An 11 plate Nissan Leaf, done 80,000 miles, only has a range of 35 miles', as quoted by Chris Harris at the end of Series 27: Episode 2 on Top Gear. And from an original range from new of 124 miles to just 35 miles means its lost roughly about 20% of its useable battery life every year. Which means if you do a lot of miles, batteries are not the best means of storing your electricity under those circumstances. But if you just want to nip into town to do the weekly shop and don't do a lot of mileage per year, it allows you to park in electric car parking spots down at the shops, but not much more of a benefit over a petrol car if you aren't overly bothered about the environment apart from the smoother and quieter driving experience.



Toyota Prius from Google Images

Hybrids are currently and quietly out there, but I can only really see them as a halfway hop between fossil fuelled vehicles and electric vehicles. So apart from the Swarms of Toyota Prius's at 1am on a Saturday Morning across Battersea Bridge in London, I can only really see these being used by people who want a performance petrol powered car in the future during the phase out of fossil fuelled cars.

So Finally, Hydrogen. Well I see this as the best alternative as a usable, reliable, and cleaner alternative to fossil fuel. If they can get the price of the cars themselves down and get the infrastructure to the same levels as we have today with petrol stations, it could overtake the sales of electric cars as it needs less adaptation to most people's current daily routines. They also don't have the long-term problems like battery's as the tanks won't shrink over time, and in a crash, the tanks are so strong, that there is almost no chance of an explosion. It also has the perc's of having the capability of running as an electric generator for your house if there's ever a case of a power cut.

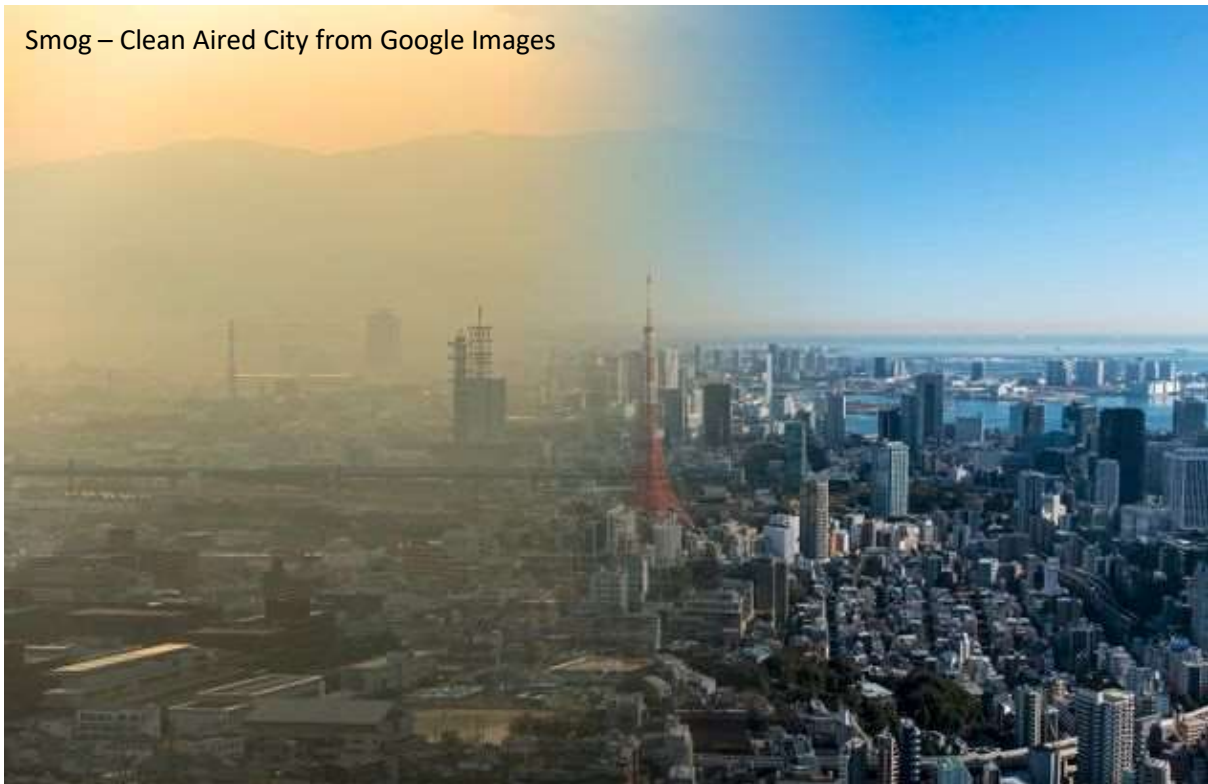


Conclusion

Whilst writing this dissertation, I was in the middle of looking for a new car and was open to the idea of an alternative fuelled car, but currently, there just isn't anything that fits my lifestyle or drives that well within a fairly average budget, so I ended up going for an uneconomical, all wheel drive, sports car, as there just isn't anything that attracted me to go down the cleaner route currently on the market.

But Conclusion, I think that the use of Hydrogen fuel could attract more people to use it in the countryside in the future, as it provides the best blend of green credentials and refined powertrain of an electric car, but the everyday usability, reliability, and quick top ups of fuel like a diesel car. The main problem at the moment is convincing people to change, as a lot of people in secluded villages don't like change and are scared of it. So, if we can get more variants and bodystyle's of hydrogen powered cars rather than just 2 SUV's and 3 saloons on sale now. So, it should build up slowly like the electric car did about 10 years ago, and hopefully this should be the start towards a greener and cleaner future that could be well established before the year 2040, when the production of fossil fuelled cars is required to end.

Smog – Clean Aired City from Google Images



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