

## ELECTRIC VEHICLES..... Do I or Don't I?



The motor vehicle is a significant source of atmospheric pollution affecting climate change and depleting oil resources, but we all depend on them for our freedom of movement. Lifestyle support, work, leisure and essential travel where distance is involved nearly always falls back on the car, but should we be considering changing from fossil fuels to electric??

A question that many of us have asked ourselves but we are confronted with technology fog and doubts, what should I choose, will it meet my needs, price, driving range and can I get it recharged etc.?

Four members of the ADAPT team have taken the plunge all with different answers and all with a minimum of one year's experience to share with the readers. Each vehicle discussed represents one of the four main types of electric vehicle on Britain's roads today.

### The Nissan LEAF ~ Battery Electrical Vehicle ~ BEV

The concept of a BEV is a vehicle powered purely by batteries with no additional energy source.

We bought our 2<sup>nd</sup> hand Nissan Leaf back in March 2019, trawled the country for a good deal and picked one up at auction locally £2k cheaper than the dealer price. Top of the range Nissan Leaf 80kW Tekna 30kWh 5dr Auto. We have not installed a home charging point but use the 13amp 3 pin plugged charging cable supplied with the vehicle. This charges at 2.5kW/hr and provides more than enough charge power for our needs.



We have travelled 11500 miles at a fuel cost of 3.9p/mile, not using off-peak electricity tariffs. This takes into account our charging costs from roadside charging stations. Total motoring costs including insurance, MOT and running costs 6.77p/mile This does not include depreciation. This can be high for any high-tech car as technology is moving on at pace.

We have test driven 2 brand new electric cars over several days, but both have not been as quiet or as comfortable as our Leaf. The driving in silence is incredible, allowing you to hear bird song which was previously masked. Although bought as a runabout, before lockdown we went on several long journeys. These require meticulous preparation currently, due to the shortage of charging stations, their potential incompatibility with your car charging plug, and if they are out of use. We have 7 apps and the most useful is ZAPMAP. Each of the charge point providers have a different payment and login in structure. Most have good help lines if you get a good mobile phone signal at your charging point. We have stopped at several which are free, and the most expensive are the motorway service stations, £7 for a 40 minute charge. Our range is 125 miles between charges, one stop to Guildford, Bath, Aberystwyth, North Lancs. On one occasion we drove on empty showing zero miles left for 10 miles whilst we found a working charge point, so there is a reserve, but it was stressful....!

*Source: Mr Chris Knibbs*

## The BMW i3 ~ Range Extender Vehicle ~ REEV

We have been running our 3-year-old BMW i3 range Extender for a year now and are delighted with our first experience of electric cars. Ours is an unusual type which normally operates as a full electric but has a small 600cc petrol generator in the rear which will charge the batteries if you run out of electric range. Under electric power our range is 120-150 miles in the summer, and 100-120 miles in the winter if using heating, lights, wipers etc. The range extender adds another 70-100 miles without topping up with fuel, again depending on conditions. Range, of course, depends heavily on how economically you drive too!

Electric car driving is so easy. The energy recovery when you take your foot off the accelerator means you seldom use the brake. It is so quiet and smooth too. A joy to drive.

We charge up mainly at home overnight and have a tariff which gives us four hours of charge at 5p / kWh – almost a third of the standard rate. Energy costs are 3.5-4p / mile at standard rate and less than 1.5p/ per mile for the off-peak power. Compared to perhaps 12p per mile for petrol cars, it's a big saving. We have driven about 6000 miles in the last year. The CO2 emissions saved are about 1 tonne or over two thirds. This is equivalent to driving a small / medium car to Moscow and back!



A lot of our longer runs seem to be about 70 - 80 miles each way, so the range extender works well for us as these runs would be just beyond the electric range of the car. Some of the latest electric only vehicles could now do these journeys without re-charging. The removal of 'range anxiety' is valuable to us, but there is a penalty in road tax. In the year we have only used about 7 litres of petrol, so nearly all of the miles covered have been on electric power. We have only once used fast charging at a service station which gave us a nearly full charge in 35 minutes at a cost of 10p/mile, so still less than using the generator to get home.

*Source: Mr Andy Hannah*

## The Hyundai Ioniq ~ Hybrid Electrical Vehicle ~ HEV

The concept here is a self-charging power system with a full sized petrol engine as well as an electrical battery source and either are used to propel the vehicle.

My motorway driving started in the 50's, driving a Minibus through the Autobahn tunnel under the Kiel Canal heading for Denmark and beyond. The most recent was the the M6, A14, M11, to East Anglia, family visiting. In between, I married a Swiss wife, three children arrived, and we drove everywhere across western Europe, visiting family and friends in British, French and German cars - but never an Asiatic one.



Then Hilda's rheumatism began to feel the stiffish suspension of our Audi, and we woke up to the Climate Crisis. One daughter has a Nissan Leaf, but suggested that it was not for us. Coincidentally, I read that the Korean Ioniq was rated best Hybrid in an American survey - so we arranged a test drive of a second-hand vehicle, 12,000 miles, at about £17,000.

It looked different, wedge shaped, high at the rear, but easy to get into and out of, spacious inside, plenty of storage (including a huge boot), heated fabric seats and leather steering wheel; remote locking, push button starting and foot operated parking brake, and Automatic: Parking, Reverse, Neutral, and Drive (with a Sports mode which helps at busy roundabouts and surprises boy racers who sidle up beside you at traffic lights - Yes, I'm human!). Never having driven automatic before, I'm converted. An inboard computer does all the work, choosing the optimum gear and when the 1500cc engine should be engaged, silent and smooth. A host of digital wizardry comes as standard, including an optional screen showing whether the car is operating on battery or petrol, how the brakes are charging the battery, and what your present mpg is. SatNav is inbuilt, and a rear view camera when you engage reverse. In Cruise Control, if the vehicle in front slows down, you do, because of a radar signal beamed forward. The shape is wind tunnel designed to cut through the air (and airflow clears rain from the back window) and light materials are used whenever safety allows.

The result is that having driven 14,000 miles, our overall mpg is 65.26. On a long journey it will get up to 71mpg, AND we pay no Road Tax. We love it!

*Source: Mr Howard Hilton*

### **Mitsubishi Outlander ~ Plug-in Hybrid Electrical ~ PHEV**

At the end of 2018 I began investigating the market for a replacement for my diesel-powered Mitsubishi ASX. Whilst the comfort of the car was far better than any previous vehicle I had owned, I realised, that despite earlier information provided by HMG, diesel cars were heavy pollutants particularly when used mainly on short journeys. Following my retirement, the majority of my journeys in the car were going to be short ones, with the exception of regular visits to see my mother in law in Lancaster and going on holiday with our touring caravan.



To minimise emissions, the use of a totally battery powered vehicle would be the ideal solution for 90% of the annual car journeys but not powerful enough to pull a caravan. The Outlander PHEV has proved to be the ideal vehicle for those of us who have need of the additional power provided by a petrol or diesel driven engine. Using the Outlander over the last 18 months has proved extremely economical because all of my day to day driving has been easily serviced by charging the built-in battery, which has a range of 27 miles, overnight. I can for example drive to Crewe and back on a single overnight charge at a cost of £0.58p, if charging on day rate the cost is only £1.38p, where as the cost of petrol for the same mileage would be £4.16p.

In addition to charging the battery via the electricity supply, the battery also charges as you apply the footbrake and there is even the facility via paddles on the steering wheel to slow down the car via the regenerative braking and so save wear on the brake pads.

When journeys are going to be longer than the 27 mile battery range I have found that saving the battery power for the in town journeys and queues on motorways allows me to maximise on overall MPG and yes there is also a switch that allows me to select between battery and engine.

Finally, how did it perform when towing the caravan? I can only say brilliantly because my return journey from the Gower Peninsula avoiding big delays and toll charges on the motorways took me over a large number of steep hills through mid-Wales. On the uphill sections the battery reserve kicked in to provide the needed additional power to avoid a drop off in speed and on the downhill sections I was able to use the regenerative braking to recharge the battery and save on brake pad wear.

*Source: Mr David Higham*

### **In conclusion...**

Real life experience says a lot more than much of the sales literature particularly when the user has assessed what they need and expect, how they intend to use the vehicle, what size and whether it will be used primarily for local journeys, rural, motorway or long journeys etc. All of the above options have shown a reduction in fossil fuel usage hence less CO<sub>2</sub> emissions although there is quite a variance as the Leaf is an exclusive battery powered vehicle whereas the other three vehicles have a supplementary internal combustion engine (ICE). The vehicles with an ICE eliminate the range anxiety that drivers experience when on a low battery charge and not knowing where there is a charging point available.

As has been pointed out above when driving a fully electric vehicle (BEV) it is necessary to plan journeys carefully to ensure that there is sufficient charge for the journey either totally or by charge point stages. Vehicles with range extending capability reduce any range anxiety whilst also having the benefit of full battery operation for the majority of time with less risk of being marooned.

In the cases where vehicles have ICE there is a form of regenerative braking or energy recovery that supplements the battery charge improving motoring range. It is also worth noting that the vehicle and battery technologies are developing quickly offering potential improvements in all aspects of the driving experience.

When looking into electric vehicles for personal use battery charging needs to be considered carefully as there are different charging systems, whether at home day or night, on street at a higher charge rate or rapid/fast charging. It is relevant to point out that for those without off-street parking the choice at present is in practice restricted to the Hybrid Electrical Vehicle (HEV). Are electric vehicles a step in the right direction? Well, we can see from the experience of the ADAPT members that they believe so. Even though there is a wide variation in type clearly, they are well matched to their needs and uses.

*Compiled by Alan Draper, on behalf of ADAPT's Energy Group*