Bird & Bird & Energy

Electric Vehicle Charging in the UK


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Entering the market: the time is now

Electric vehicle ('**EV**') numbers are still small in the UK – there were 141,270 EV sales in the UK in 2018, 6% of the total 2.37m total UK car sales in 2018. Of these sales, 15,474 were pure electric (0.7% of the market), with the rest hybrid. But the number of EVs is steadily increasing, with EV sales up 20.9% from 2017 to 2018, and pure electric EV sales growing 13.8% in the year.[i]

We have never been more keenly aware of the need to decarbonise all aspects of our lives to tackle global warming. Amid much publicity the UK recently pledged that UK emissions will be 'net zero' by 2050, becoming the first G7 country to do so. Decarbonising transport is a huge part of getting to net zero, as we look to a future where we will no longer rely on fossil fuels to get from A to B.

To enable mass adoption of EVs in the UK we will need reliable and convenient charge points, and plenty of them. The risk is that lack of charging infrastructure could inhibit the growth of the EV market.

This paper explores how the roll-out of charging infrastructure will be achieved in the UK, considering the current barriers to growth and how to tackle the issues - including the need for a national strategy, charging infrastructure business models, the readiness of the grid for mass adoption and the availability of batteries.

There will be lots of players in the charging infrastructure market – including electricity generators, infrastructure installation and maintenance contractors, software providers and OEMs (manufacturing charge points, batteries and cars). It is unlikely that one party will be able to provide all of the services required to service the market so collaborations and partnerships are expected. The scale of the opportunity is huge.

Whilst the UK EV market is still in its early stages, it is growing quickly and it is clear that as EV profitability increases, the charging infrastructure market will grow quickly around it. It is therefore key to understand how EV charging works in the UK, to consider the role your business could play and when to jump in – if you want to participate, the time is now.

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The challenge and the opportunity

Cities of the future

Cities are home to over **50%** of the global population[ii] and are responsible for approximately **75%** of total energy use[iii]. These figures will only continue to increase, with forecasts that there will be 43 megacities each with more than 10 million inhabitants by 2030.

Concentrating our population in this manner creates a major air pollution issue in our cities and poses a substantial public health risk. A 2016 paper published by the Royal College of Physicians[iv] reported that around 40,000 deaths per year in the UK are attributable to exposure to outdoor air pollution. The associated costs to business, the NHS, and the people who suffer from health problems caused by air pollution exceed £20bn each year.

The transport sector is the single largest contributor to greenhouse gas emissions in the UK. As well as CO2, this includes harmful nitrous oxides - a major component of smog and an irritant to respiratory tracts and eyes. It is also responsible for generating harmful particulate matter which is absorbed into the lungs and bloodstream causing long term health issues.

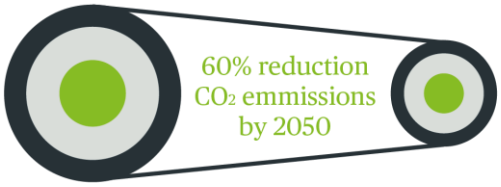
At the same time, the transport sector is a key enabler for economic growth across the globe. We need to find a way to reduce greenhouse gas emissions and particulate matter from transport, while continuing to grow the sector as a whole. The widespread deployment and adoption of Electric Vehicles ('**EVs**') can help to achieve these goals.

Targets, incentives and future forecasts

Targets

Ambitious targets have been set to reduce greenhouse gas emissions and increase the number of EVs at both a national and European level.

In the UK, the Climate Change Act 2008 requires us to reduce GHG emissions by at least 80% of 1990 levels by 2050. On top of this, the Government has recently pledged that UK emissions will be 'net zero' by 2050, becoming the first G7 country to do so[v]. In terms of EVs, the Government's vision is that by 2040 every new car and van sold should be effectively zero emission, although notably this has been criticised by some as not going far enough.



The European target

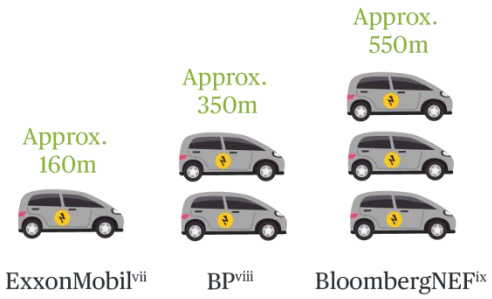
At a European level, the EU's Clean Power for Technology policy has a set a target of 60% reduction in CO2 emissions from the transport sector by 2050. In addition, EU vehicle regulations impose a new car fleet average emissions requirement of 95g CO2/km by 2021.[vi] This may be challenging for the UK given average CO2 emissions in 2018 stood at 125.1g CO2/km, and have in fact been on the rise since 2016.[vii]

Incentives

There are a range of incentives available to people that wish to invest in EVs or EV charging infrastructure. For example, the UK government offers 'Plug-in Grants' of up to £3,500 for the purchase of eligible low emission vehicles. Funding has also been available for installing EV charging infrastructure, such as the £30m Plugged in Places programme and the £35m Ultra Go Low Cities initiative. In addition to this, there are also various incentives provided at a local government level ranging from: free parking for EV users, free charging at certain charge points, the use of bus lanes and exemptions from toll roads or designated low emissions zones. However, these are not uniform across local authorities and so benefits available in one area may not be available in another.

Forecasting the future

What does the future hold? Forecasts for the number of EVs globally by 2040 vary widely depending on the organisation, with BloombergNEF forecasting 550m, whilst ExxonMobil offers a much more conservative estimate of 160m.



What is certain is that the number of EVs is rising, but is it rising fast enough? Are we likely to reach the targets that have been set and what are the main barriers that we have to overcome in order to do so?

Public perception - commonly cited barriers to uptake of EVs:

1. Cost of the vehicle
2. How often the battery will need to be charged (range anxiety)
3. Availability of reliable charging infrastructure (experience anxiety)

Conversations in the energy industry often focus on the grid's ability to cope with the additional demand that mass EV charging would bring. However, one of the principal factors that will determine EV numbers in the future is actually global battery production capacity, which at current forecasts will not be enough to produce the number of EVs we need.

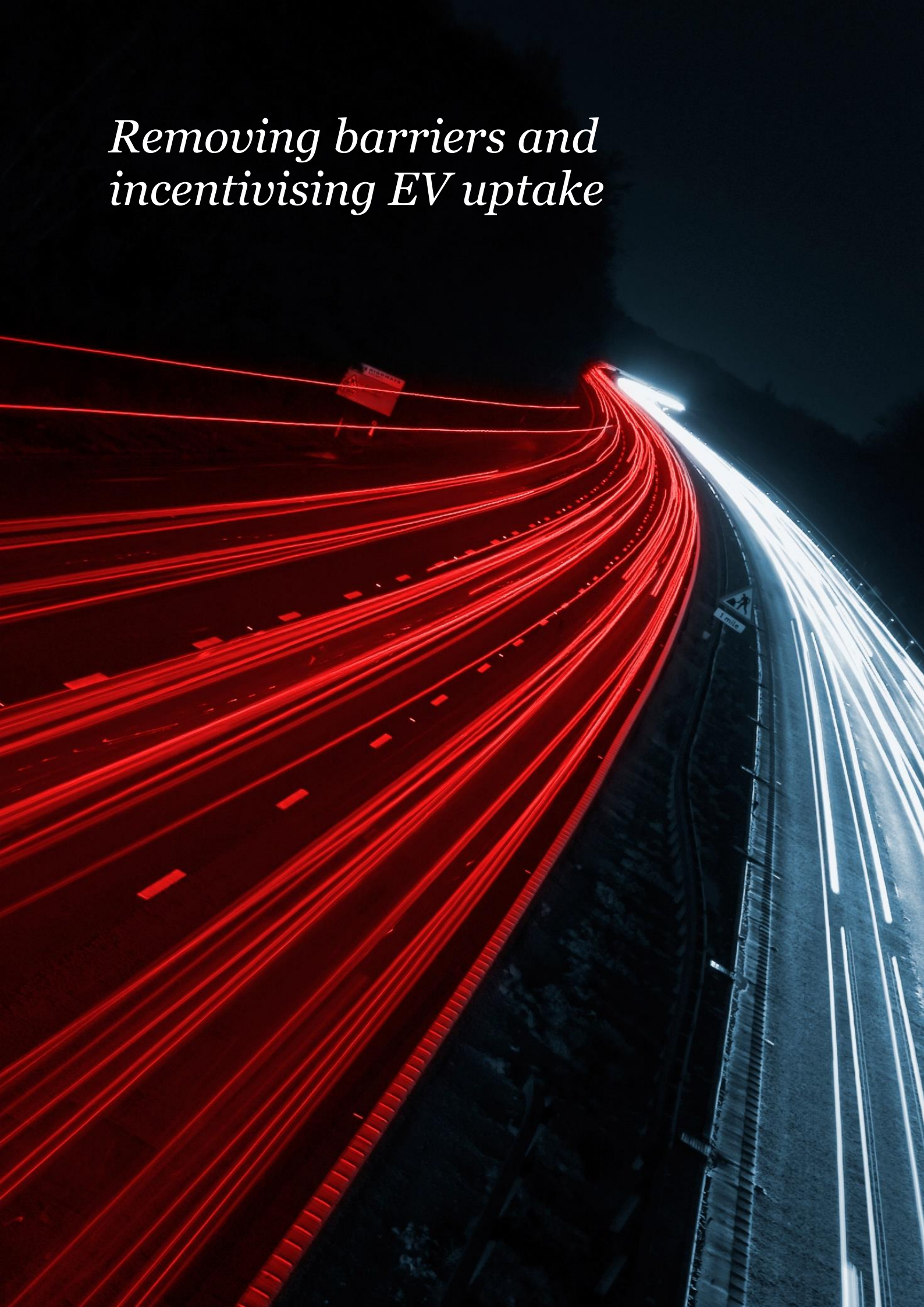
Does the current environment stimulate demand for EVs? The scale of the opportunity is huge. However, we need to take significant action if we are going to meet the ambitious targets that have been set by Government.

We need to create an environment that will lead to an increase in the demand for EVs in the UK. In the shorter term, this could increase the UK's global market share of EVs and help to divert the current maximum number that is available to our shores. In the longer term, an increase in demand should stimulate investment in new battery production capacity enabling a greater number of EVs to be produced.

We will also need to make sure that sufficient charging infrastructure is available in the right places for EV users to charge their cars, and make sure that our energy system is ready to accommodate the increased number of EVs that will be connected to the grid.

In the next section we set out the barriers which should be removed and incentives which could be provided to achieve the goal of mass EV uptake.

Removing barriers and incentivising EV uptake



National strategy

Road to Zero Strategy

In July 2018 the UK government announced its Road to Zero Strategy and set up an Electric Vehicle Energy Taskforce.

The Road to Zero Strategy includes a headline ambition for at least 50% of new car sales, and 40% of new van sales, to be ultra-low emission by 2030, building upon the previously stated commitment for 100% of new cars to be ultra-low emission by 2040. The Strategy also:

- creates a £400m charging infrastructure investment fund
- includes a grant of up to £500 for EV owners to install home chargers
- extends existing plug-in car and van grants

> The Committee on Climate Change recommends that by 2030 (or at the latest 2035) all new cars and vans should be electric or use a low-carbon alternative such as

The Taskforce's aim is to encourage the automotive and energy industries to work more closely to ensure that the UK energy system is ready for and able to facilitate and exploit the mass take up of EVs. On 15 July 2019, the DoT launched a consultation on cyber security and interoperability of charge points, as well as its use of the Automated and Electric Vehicles Act 2018 which enables law making through secondary legislation. The consultation closed on 7 October 2019.

Whilst the messages and ambitions from UK government are promising, a May 2019 Report by the Committee on Climate Change ('**CCC**') has suggested they do not go far enough. The CCC instead recommends that by 2030 (or at the latest 2035) all new cars and vans should be electric or use a low-carbon alternative such as hydrogen.[viii]

The UK government seems to be lacking a detailed plan for how targets should be realised and where funds being made available should be used for most impact.

Some national strategy has been introduced, such as the recent government proposal to change building regulations to require all new-build homes to include an EV charger. The DoT also recently ran a consultation on private charge points which closed on 7 October 2019.

A varying approach to roll-out

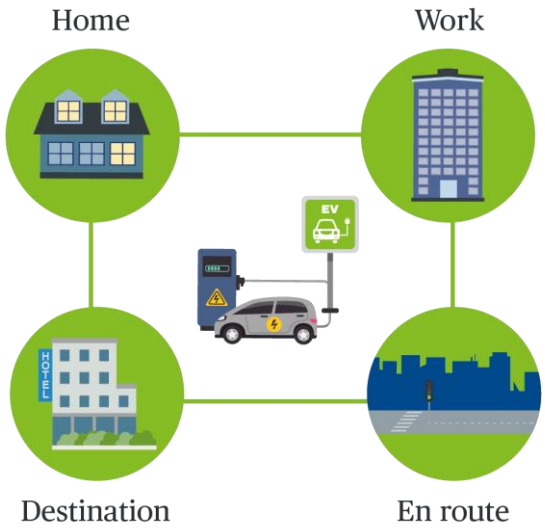
However, different approaches to the roll-out of EV infrastructure are still being taken at a national, regional and city level. As a result, charging infrastructure is likely to end up being clustered around high volume usage areas, because these areas will have the best business case/value for money for partners to invest in, without a more strategic overview being taken of where the infrastructure should be located to ensure it is available for all. Allowing boroughs and cities to each take their own approach will also very likely mean that a lot of work and investment is replicated, as many boroughs and cities carry out similar feasibility studies and pilot projects, rather than learning from work already done in other similar places and implementing a more standardised approach.

A more detailed and prescriptive national strategy would allow for oversight into these potential pitfalls, ensuring an efficient and even distribution of EV charging infrastructure across the UK and delivering best value for money.

Charging infrastructure: what does the future look like?

Charging locations: present and future

Currently most EV owners plug in to charge their vehicles at home or work, but there are four potential charging locations:



Predicting and planning for use

The mix of charging location use will depend on various factors: the area of the country, rural or urban setting, access to off-street parking, and is likely to change over time as EV battery range improves. Destination charging will include charge points at supermarkets, shopping centres, gyms, cinemas, hotels and train stations.

Deloitte forecasts that the UK will need around 28,000 public charge points by 2030, and to invest a further £1.6 billion in the infrastructure to meet the needs of an estimated seven million EVs in use by then[ix].

In order to appropriately plan for EV mass adoption, we need to be able to accurately predict when and where EV charging will take place. Various studies on this have been done, and to aid further studies the Government has mandated all charge points to be smart from July 2019 (in order to be eligible for funding). Data collection will be key to understanding user behaviour and planning for mass adoption. It will also introduce issues that the smart meter and digital communications industries have been grappling with around data protection and cyber security.

Aligning investment to evolving patterns of behaviour

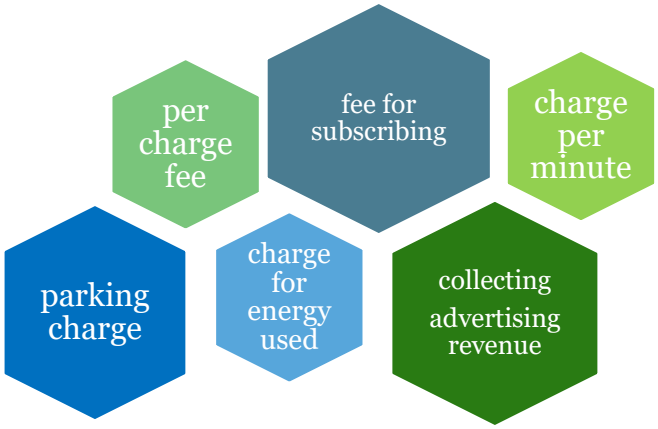
There are also concerns about how much to invest in charging infrastructure now, at a time when charging patterns are likely to change with improvements in EV battery range, and when existing charging options are not bi-directional, meaning that if vehicle to grid becomes the norm existing chargers may need to be upgraded, replaced or risk becoming stranded assets. This needs to be balanced with the requirement to have enough charging infrastructure available to encourage consumers to switch over to EV.

Potential business models

If charge points are built at scale, they could be treated as an infrastructure project, to be constructed by a specialist contractor and then perhaps owned and/or run as a concession by an O&M company in return for a fixed revenue or a cut of the sales. This could be funded using an asset or lease finance model (such as the ChargePoint Key Equipment Finance model), or by venture capital or traditional infrastructure investors.

A key question for a potential investor in charge point infrastructure is how to recover cost of the infrastructure + operation and maintenance costs. In order for these costs to be funded, a secure revenue stream is required. This revenue may take the form of any of the below models, or a combination.

Charge point revenue models:



Business models for investment into pure charging infrastructure are not currently very attractive, with Deloitte forecasting EV charging is not profitable at present, but that this should change once EVs make up at least five per cent of vehicles in circulation, or about two million units[x]. In the meantime some players are considering co-locating charging infrastructure with behind the meter solar and/or energy storage. Storage solutions would operate by charging the batteries in times of low demand and then discharging to vehicles as required.

Managing the relationship between users, operators and providers

Ownership of the relationship between EV users and charge point operators or electricity providers will also become more important. In addition to billing, in the future this arrangement may need to cover the likes of smart charging and the ability to use vehicles for demand side response ('**DSR**'). The most successful market participants, whether utilities or other parties such as aggregators, will be able to develop their relationship with consumers from a traditional utility model providing consumers with electricity, to offering customers a managed electricity service, including energy efficiency services; connecting smart home appliances; DSR and smart charging; and providing electricity generation assets (e.g. solar panels).

Once the market broadens from the enthusiastic early adopters of EVs to a mass market of consumers who see an EV simply as a means of transport, consumers will increasingly expect an experience which is no less convenient than their current method of refuelling at a petrol station. There are two types of fuel – petrol (gasoline) or diesel, and any fuel nozzle fits any car. This is not the case for EVs, where there are still several different charging connectors, inlets and plugs, and myriad options for paying for time spent at the charge point, depending on who the charge point is owned by.

How will legislation play a part?

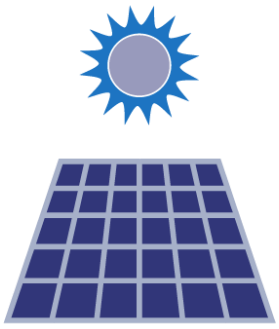
The lack of consistency in how EV owners can (i) access chargers and (ii) pay for the charging time is being considered and tackled at an EU level, with legislation such as the Alternative Fuels Infrastructure Directive. This directive, which has been transposed into UK law, sets common technical standards for charging infrastructure across the EU to enable interoperability/e-roaming across vehicles and between countries and to ensure minimum standards. The UK government also has theoretical powers pursuant to the Automated and Electric Vehicles Act 2018 to make legislation relating to EVs, but has not yet used these powers. As noted above, the government has recently issued consultations on cyber security and interoperability issues under this act.

Leveraging technology to save energy and predict use

Aligning energy requirements to consumers' predicted use

The average UK vehicle is parked for 90% of its lifetime: in a work or public car park during the day, and at home overnight. A parked EV is unused energy capacity waiting to be discharged. There is an opportunity to harness this unutilised resource, either by discharging energy to be used in the home, or discharging back to the grid in response to demand cues.

In a demand side response ('**DSR**') scenario, consumers would be able to specify (probably on an app) when they will need to use their car and their chosen minimum charge level, which may change over time e.g. a car parked in a long-stay airport car park provides great potential for DSR. Harnessing Internet of Things technology would allow consumers to be prompted when plans change at this could impact on the required charge e.g. if you have a flight booked for a two week holiday, the car probably doesn't need to be sitting on your driveway charged and ready to go; if your calendar indicates you will be driving further than usual to a meeting tomorrow perhaps more charge is required. Depending on each consumer's requirements, the car and at-home charger would then make available any excess charge to meet grid demand. This type of arrangement will require sophisticated communication infrastructure, and we may see technology and communications companies entering the electro-mobility market to provide these solutions.



Can spare capacity be used to meet demand?

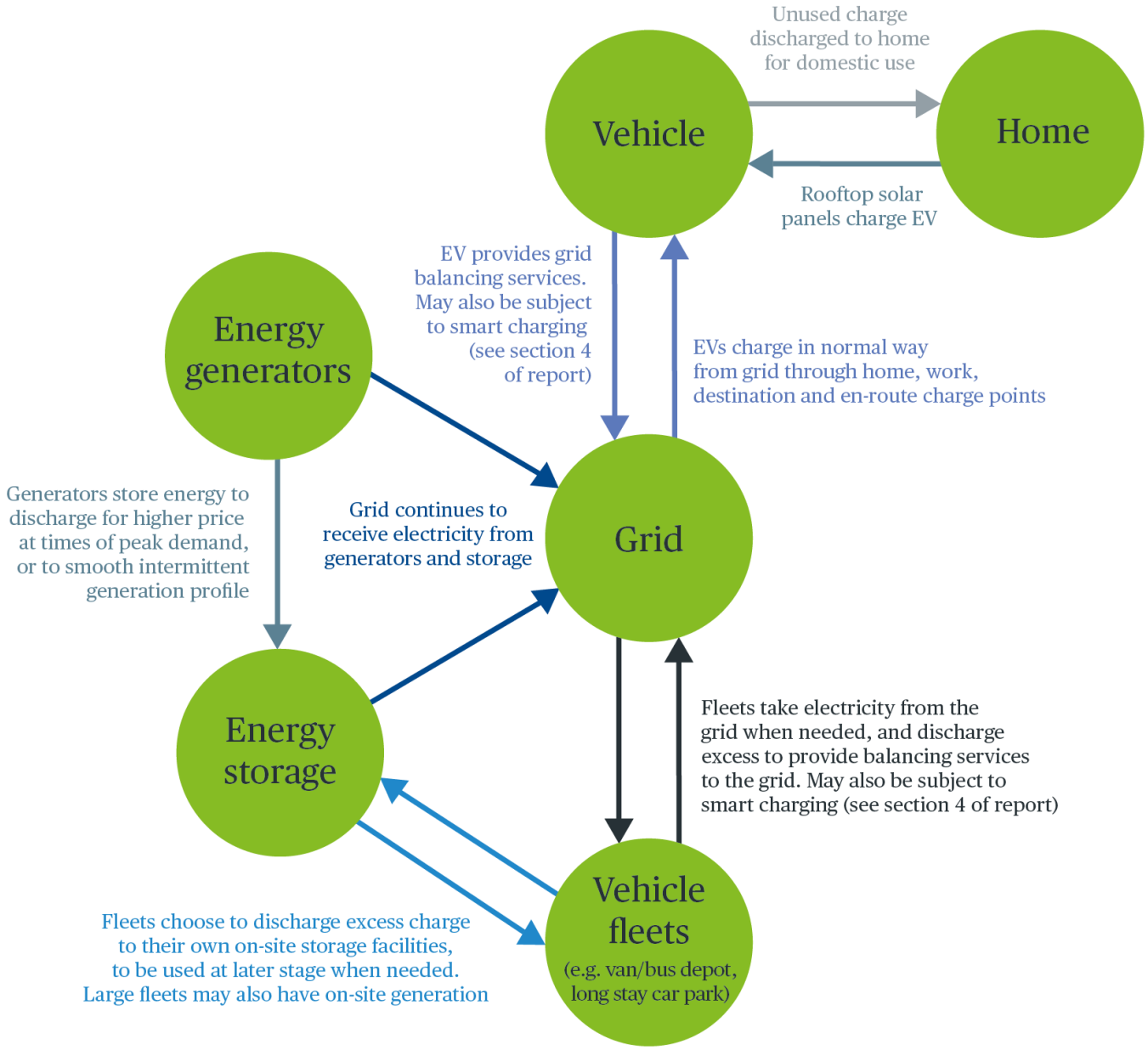
Once aggregated, spare EV capacity could go a long way to balancing the need for additional generation capacity to meet the increased demand that mass roll-out of EV would inevitably place on the grid. Using EVs for DSR would also be a cheap way of delivering these grid services, as capex costs would be much cheaper than e.g. building new storage for demand response, as the cars have already been purchased for another purpose.

We may also see increased use of 'behind the meter' generation (e.g. consumers generating electricity from rooftop solar on homes and businesses) being used to charge EVs. Consumers could also, given appropriate regulatory framework, act as distributed generators and sell excess energy generated from rooftop solar to neighbours or local businesses. To support this, policy will need to be aligned to ensure that there is a netting of the taxes paid to charge/discharge to avoid double taxation issues and incentivise using own energy.

Vehicle to grid is not yet a reality, but the market is confident it will happen and it raises an exciting prospect for the future.

Vehicle to grid: a connected future

We set out below the ways in which EVs and the grid could interact, with EVs providing support to the grid in a connected future.



Grid infrastructure and upgrades: key concerns

Increase in demand, and particularly peak demand

It is clear that mass roll-out of EVs would result in more electricity being consumed, as fossil fuel consumption falls. This can largely be supported by additional renewable generation coming online. More challenging is the prospect that as EV use becomes more widespread, consumers will not only be using more electricity, but also narrowing their diversity of use, with EVs likely to be plugged in en-masse at certain peak times of day (e.g. 5-7pm at home following commute).

National Grid estimates that peak demand from EVs alone will be 5GW by 2040 (a c.8% increase in 2017 peak demand value).[xi]

Ways to ease the impact of increases in peak demand in the future:

- DSR (discussed above)
- Smart charging

Smart charging

This would work by restricting or incentivising network operators and EV owners to avoid peak charging periods.

We, as consumers of electricity are all used to a firm connection to the grid: the light comes on when we flick the switch at any time of day or night. But some consumers may be willing to accept a non-firm connection to the grid, restricting them from using electricity to charge their EVs in peak periods, if this was accompanied by an attractive associated price decrease, or to avoid a price increase. Network operators could provide signals of price decreases/penalty increases depending on projected peak demand times, or if there was local congestion. Indications from the ongoing Electric Nation trial are that most consumers are positive about smart charging.

What grid upgrades are required?

The My Electric Avenue trial (completed in 2015) indicated that at least 30% of UK low voltage networks will require investment by 2050 to support widespread adoption of electrified transport – an estimated £2.2bn investment. Battery sizes and charging rates have increased since this trial ended, so the impact on the network may in fact be greater.

The Greater London Authority is already considering mandating grid upgrades and EV charging infrastructure as part of planning requirements for new building developments in London.

Grid reinforcements are most likely to be required for new en-route chargers, where legacy sites (e.g. motorway service stations) may not fit neatly with locations where there is the spare capacity to allow for new connections. Grid reinforcements may also be required to accommodate EV fleet owners, such as TfL, who will need large depot-sized connections with fast charge points to ensure that vehicles are utilised effectively. Unavailability of grid connections or high cost of new connections to take into account cost of grid reinforcement may delay/deter new projects. Smart charging is one option for fleets (as trialled by UPS in the Smart Electric Urban Logistics trial), or alternatively relocation to a site with available capacity.

The role of OEMs: driven by carrot or stick?

The primary role for original equipment manufacturers (OEMs) will be to make enough EVs, and to make them cheaply enough, to facilitate mass roll-out. A key question therefore is how OEMs should be incentivised to produce more EVs: a carrot (government subsidy, either to manufacturers or more commonly to purchasers of EVs) or stick (regulation requiring e.g. reductions in emissions, restricting access to cities for non-EVs or limiting non-EV car sales)?

Vehicle manufacturers will also have a role in ensuring that both charging and payment methods for their EVs are standardised sufficiently to ensure that consumers are able to use any charge point and any payment method. This will reduce so called experience anxiety.

Finally, under EU legislation OEMs will retain responsibility for recycling returned EV batteries, as discussed in more detail below.

Two contrasting approaches:

Restrictive regulations: China

Six Chinese cities have implemented laws which significantly restrict the purchase of internal-combustion-vehicles. If those six cities were each considered a market in their own right, they would each have been in the top ten EV markets in the world in 2018 (alongside countries such as Germany, France and the UK).

In addition, car manufacturers operating in China will be restricted from opening new manufacturing capacity for non-electric cars, unless they can meet conditions including: showing their efficiency in using existing manufacturing capacity is higher than the industry average; that they make more low-emission vehicles than the industry average; that they spend a proportion of revenue on research and development; and are globally competitive.

It should be noted that this 'stick' approach taken in the Chinese market is an attempt to move away from the previous 'carrot' approach. In addition to the regulation described above, monetary subsidies which were previously widely available in China are now being partly replaced by an emissions cap-and-trade system.

Subsidies: Norway

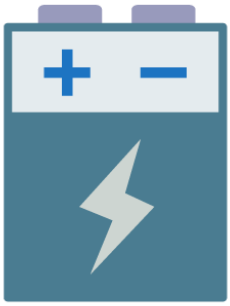
Norway's approach to meet their commitment for all new vehicle purchases to be low emission by 2025 has been to offer major incentives. These have included: no purchase or import tax being payable on EVs; exempting EV purchases from VAT; offering free parking; and an exemption on charges for toll roads. This approach has led to a high uptake of EVs – half of all new cars bought in Norway are now electric or hybrid.

Critics often say that Norway is a model which is not easily replicable (with a wealthy and small population, existing high costs to purchase traditional vehicles making cost-parity relatively easy to meet with subsidies, and plentiful cheap hydroelectricity). However, it seems certain that some form of incentive or regulatory intervention will be required to kick-start the EV market in the UK and create the right conditions for mass uptake, at least up to the point that EV prices reach parity with traditional vehicle costs.

Batteries: storing up problems?

Production, second life use, recycling and disposal

China dominates production



Less than 1% of global lithium ion cell production for the automotive sector comes from Europe; but new factories or recently opened plants from companies such as South Korea's LG Chem, Samsung SDI and SK Innovation, and China's CATL should help boost that figure to between 10% and 15% of global production by 2025. China is currently the dominant production centre for lithium ion cells, accounting for60% of the global total, with Japan second at 17% and Korea third at 15%[xii].

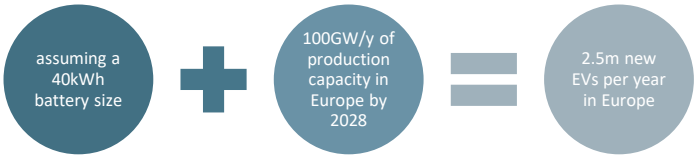
Bottlenecks in battery production impacts the ability of European vehicle manufacturers to fulfil EV orders and is frequently cited as the cause for delays to delivery. Factory cost is often the reason OEMs and suppliers in Europe do not build battery cell production capacity, but of course you have to be big to make production work.

Swedish battery manufacturer Northvolt recently secured a €350 million loan from the European Investment Bank ('EIB') to finance the construction of a battery manufacturing plant, as part of their plans to bring 32GWh of annual battery capacity online by 2023. This is EIB's biggest direct financing of battery technology to date[xiii]. Another large scale project includes Groupe PSA, through its subsidiary Opel, and battery cell manufacturer Saft, a subsidiary of Total, which plans to convert an Opel production site at Kaiserslautern in Germany into a gigafactory: this is reported to have attracted EUR 1.7 billion of government funding[xiv].

Aligning battery capacity with EV capacity

As with estimates of how many EVs will be on the road in coming years, reports differ on how much battery capacity is planned. Recent reports and announcements in Europe suggest that between 100-250 GWh of planned new battery production capacity is due to be available by 2028 (assuming that all of the new facilities overcome the hurdles to being built such as financing, planning and regulatory approval)[xv]. Northvolt has estimated that the European market will have a yearly need of 500-600 gigawatt-hours (GWh) by 2030, to be serviced by at least 10 gigafactories.

Batteries available for European market (an estimate):



This sounds significant, even at the lowest estimate of 100GWg/yr. of additional capacity. However, once you divide this between 28 EU Member States, it only equates to roughly an additional 89,000 vehicles per Member State, per year, and of course in reality some Member States will register more EV vehicles than others. By way of context, there are approximately 220,000 EVs on the road in the UK today[xvi] and 2.37m new cars (petrol, diesel and all types of EV) were sold in the UK in 2018[xvii].

There will also be significant new battery production capacity outside of Europe, particularly in the US and Asia. Some of this will be available to the UK market, however it is expected that much of this capacity will go to serve local markets: for example China is reported to account for approximately 50% of global EV battery demand[xviii]. The European Commission is aware of its deficit in battery production and heavy reliance on imports, and is currently taking steps to address this in developing its own competitive and clean battery value chain through recycling and disposal and second life use which are explored further below, as well as "cleaner" market authorisation requirements to remove hazardous waste from the production cycle.

Recycling and disposal: room for improvement

Currently only 44% of portable batteries sold are collected for recycling in the EU. We do not know the collection rates for industrial or automotive batteries and accumulators. Assuming that the number of EVs will continue to rise, further consideration is being given to determine how EV batteries will be recycled to avoid resources being wasted.

The EU Battery Directive[xix] requires EV manufacturers to finance collection, treatment and recycling of all collected batteries – how will they do this effectively? Under the Battery Directive, producers of industrial batteries (including the batteries that power EVs), or relevant third parties, must take back waste batteries from end-users, regardless of chemical composition and origin. Similarly, producers of automotive batteries (such as the batteries in traditional petrol and diesel motors) and accumulators, or relevant third parties, must set up schemes for collection of waste from end-users, or from accessible collection points.

However, in its review of the Battery Directive, the European Commission concluded that its objective to achieve a high level of material recovery had not been met since, in part, there are no detailed provisions for battery collection applicable to industrial batteries, and no detailed requirements for setting up national schemes. The European Commission has now indicated its intention to expand collection and recycling targets, currently applicable only to portable batteries, to industrial and other traditional automotive batteries in order to enable it to measure the performance of these collection schemes – this would be valuable data to underpin policy making. We expect to see big changes here.

Another issue is battery labelling. While labelling at the market authorisation stage is largely effective, the European Commission notes that if users at the end of the chain do not know either the waste requirements on them, or how to handle the battery materials responsibly to achieve high recycling efficiencies, then the battery labelling alone is not enough. The European Commission is currently considering what it could do to improve awareness along the entire value chain.

Second life use

Second life is about the circular economy: an alternative to the 'traditional' economic model (make, use, dispose) where the aim is to eliminate waste by keeping products in use for as long as possible, then recovering and regenerating products into a new use at the end of their first (or subsequent) life. EV batteries are expected to last around 10 years before they cease to meet the performances standards needed for use in a vehicle. Before the point of disposal, some EV batteries can be used for second life purposes, particularly for energy storage. Installing second life EV batteries onsite may be part of the use case to make switching to EVs more attractive for fleets and car manufacturers.

This may be particularly attractive, for example, for fleet delivery van owners where the vehicles all need to be charged at a depot. An energy storage facility could be installed alongside charging infrastructure at the depot (with second life EV batteries, or purpose built batteries as are used for standalone energy storage projects) which charges up at periods of low demand and low prices, and is then available to discharge to the fleet vehicles as and when required. We can expect to see more companies offering installation and operation

of energy storage using EV batteries as a standalone business model as demand for energy storage increases to address the intermittency of renewable energy sources.

The Battery Directive in its current state cannot keep up with the technological advancements or new battery chemistries which would enable innovation in second life use. Indeed, it is too prescriptive and does not specifically address the second life of batteries. However, in April 2019, the European Commission review of the Battery Directive appears to suggest a less prescriptive approach and a change of thinking in the European Commission towards second life.

As more and more EV batteries begin to reach the end of their lives, we envisage a market emerging to manage the process of collecting used batteries for recycling on behalf of manufacturers; this market will need its own battery waste standards and regulation. We are also already seeing manufacturers entering into arrangements with developers to sell their returned EV batteries for second life purposes.

How we can help you

Our Energy & Utilities team of over 100 lawyers across our global network combines exceptional legal expertise with deep industry knowledge and refreshingly creative thinking.

At Bird & Bird our team of subject matter experts in our Energy & Utilities group advise across a number of innovative and disruptive areas of the energy sector globally, including energy storage, energy digitalisation, EV charging, corporate PPAs and energy efficiency. We also regularly work with clients on deals to finance, construct, operate and sell all types of renewable energy projects.

In the area of EV charging, our energy sector experience is complemented by the deep expertise of our international Automotive group, who advise clients on a wide range of issues and challenges, from classic supply chain, liability and IP matters through to exciting changes driven by disruptive technology, including connectivity, autonomous driving and e-mobility. Our team is equipped to provide a full range of commercial and strategic advice spanning the entire lifecycle of a motor vehicle.

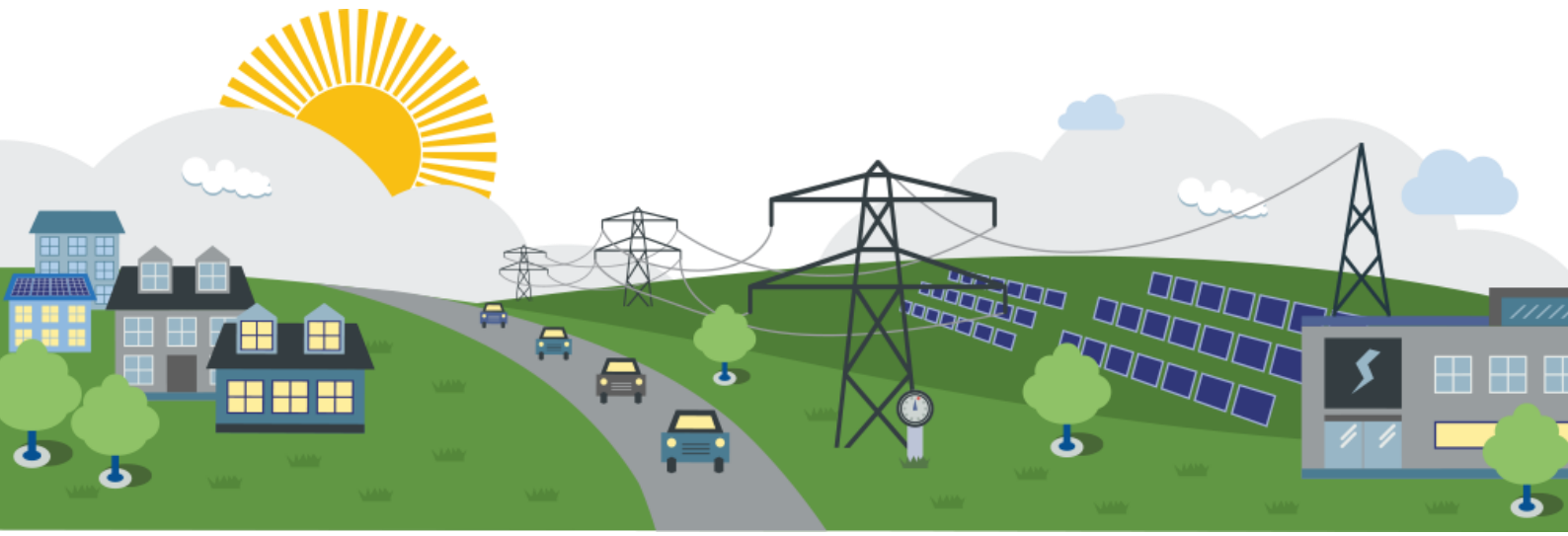
How we can help you:

- Deal structuring
- Providing UK and EU regulatory expertise
- Advising on all aspects of corporate, commercial and financing matters relating to EV charging roll-out
- A cohesive and expert team who understand how to work together to complete projects to international investor standards

Further insight

Article: Legal challenges facing manufacturers of electric vehicles in Europe

Autonomous driving: find out more



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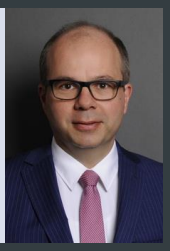

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