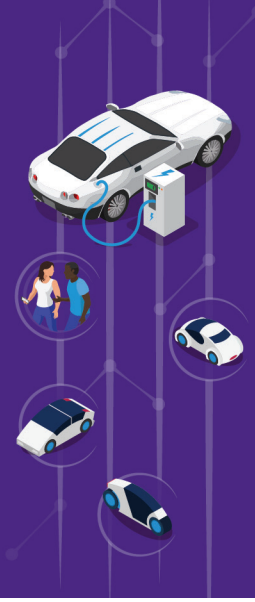
KPMG

Mobility 2030: Investment in EV Infrastructure

Not long until full charge



One of the first features of the mobility ecosystem to become truly widespread will be electric vehicles (EVs).

There are c. 170,000 EVs[1] on the UK's roads today – but we expect that to grow exponentially to some 7.7m in 2030 and 22m in 2040[2]. This means growth from 0.5% of the UK's car and van parc today to approaching 60% in just two decades.

There is no doubt that take up of EVs in the UK will accelerate (as it will in Europe and beyond). But when? To make it happen we will need to see a step change in investment into the infrastructure needed to support EVs.

In today's market, investment into EV infrastructure is being held back by three factors:

1. Short and medium term customer demand is still not known;
2. There is a danger of obsolescence as charging technology rapidly develops;
3. And both these factors contribute to a lack of clarity over the profitability of running charging networks.

Predicting when consumers will make the leap

When we look at demand, whilst we can be sure that EVs will progressively win market share, it is very difficult to calculate their growth due to the unknowns around how quickly – and to what extent – costs will fall. Currently, EVs are significantly more expensive than conventional vehicles. A VW e-Golf, for example, retails at c. £32,000 whereas a petrol model is between £18,000 to £27,000.[3] Furthermore, a home charge point could cost up to £3,000[4] to install. Despite the fact that EVs are much cheaper to run and maintain – averaging around a third per mile compared to a conventional car[5] – this premium on the price (or indeed the perceived depreciation or residual value) means that the total cost of ownership (TCO) is still higher, especially without subsidies.

At KPMG, we have estimated that EVs could reach price parity with conventional vehicles in the early 2020s. For example, batteries currently represent around 30% of the cost of an EV and have fallen to a fifth of what they were in 2010.[6] We expect a tipping point for EV adoption when a 'magic' battery cost of ~$100/kWh is achieved. Without this 'tipping point' or scale in the market, it is hard to make acceptable returns on any EV infrastructure investment. And consequently, investment decisions are hard to make when there is a lack of certainty on how quickly or how much costs and consumer demand will improve in the coming years.

[1] Aug 18 - NextGreenCar; Plug-in (PHEV) and Battery Electric (BEV) cars and vans
[2] KPMG Mobility 2030 analysis
[3] Models selected for cost comparison cost with a petrol counterpart, Renault Zoe, Nissan Leaf etc. are electric models only
[4] £250 to £1500 for a 3.5kW to 22kW home charger + installation + grid connection
[5] Study by Applied Energy, Jan 18
[6] BNEF, Dec 17

Technology: The cost of obsolescence

Obsolescence is only a marginal issue for investment in batteries, because there is a clear commercial incentive for OEMs to develop cheaper batteries with longer ranges. But it is a major issue for investment in charge points as these are fixed assets that represent a significant upfront outlay per installation. A rapid charge point could cost around £25,000 to install – and we estimate that we will need to see a rise from c.17,000 public charge points (connections) now to c.40,000 by 2030. This will require an investment between £0.5bn and £1bn . We will also need around 25,000 charge points at work and anywhere between 50,000 to 150,000 charge points in charging hubs for car and van fleets. This could require another £1.7bn - £2.3bn in private investment. And all the above excludes the further 2.5m charge points that will be required in homes.

We have already seen the issue of obsolescence arise with smart meters, where a second iteration has meant utility companies having to physically upgrade first generation meters in customers' homes. The barrier to investing at scale in charge points is evident. No operator wants to install thousands of charge points that are quickly superseded by a 'smarter' and faster model from a competitor. The key here will be to develop charge points that are interoperable between different models of vehicle (a requirement from the Automated and Electric Vehicle Bills passed by Parliament in July 2018) and ones that are 'smart,' such as the ability to deliver wireless software upgrades.

Do charging networks make money?

These barriers to achieving scale in charge points are compounded by the fact that, despite the emergence of strong brands of charge point operators, such as Podpoint, Chargemaster and Polar, the commercial models are still unclear. Current charge point operators are likely to be break-even or loss-leading due to today's relatively small market. In the future, even if certain sites have high demand and are profitable, a mass roll-out of charging infrastructure may still be loss-leading as not all sites would be commercial. The commercial model needs to be proven to attract transformational investment. But what will the successful commercial model be?

Will charge points be owned by the charge point operator who charges the customer and then shares a percentage of revenues with the host (e.g. forecourt owner or local authority)? Or will they be owned by the host (bought from the charge point operator) who then charges the customer? How many charge points might be free to the customer as an incentive to entice further business (e.g. shopping centre operators, cinema complexes)? And most importantly, who holds the demand risk while the market has not yet demonstrated scale?

Can additional revenue streams (such as enabling peak shaving or providing additional power from EV batteries for the distribution network) be the key to making money from charging? Will 'bundling' of services bring the same revolution it did to mobile phones and TV/broadband?

[7] Slow: 3.5kW to 7kW; Fast: 7-22kW; Rapid: 43kW AC and 50kW DC

[8] Zap-Map

[9] KPMG Mobility 2030 analysis; public charge points required at destinations, on-street as well as forecourts & MSAs; fleet charge points required depends on speed of charger

[10] We believe a significant proportion of public charging will need to fast or rapid chargin as customers will not have the patience to wait for 15-20 minutes for a transient charge.

A case for first mover advantage: seizing the fast lane

Given all these questions, it is unsurprising that we are yet to see large scale investments in the EV infrastructure market from any principal investor. For infrastructure and pension funds, who favour stable long-term investments, the market and business models are not yet sufficiently established or mature, making the risk and return profile harder to adopt. PE and VC houses are not afraid of the risk, but would be looking to make a short to medium term exit. It has therefore mostly been corporate venture capital from some of the large OEMs or energy giants that have galvanised the market to date. Key examples include Engie's acquisition of EVBox, Shell's acquisition of NewMotion, BP's acquisition of Chargemaster/ Polar. Similarly, OEMs like Mitsubishi have partnered with PodPoint and in Germany, six OEMs have formed a partnership with Shell and a fuel retail operator to develop rapid charge points on the autobahn.

Partnerships will therefore also be key to the development of EV infrastructure. There are many different players with the opportunity to reduce risk and develop new revenue streams and they need to explore the possibilities to create collaborations and shared projects: OEMs, forecourt operators, energy companies, local authorities, charge point operators, logistics operators and fleet operators, retail destination operators.

There are also opportunities for local authorities to install charge points on public roads and we are seeing growing numbers of initiatives around the country, some of them public / private partnerships.

Government has a major part to play. Not least because we will need to see significant upgrades to local distribution grids run by the distribution network operators – which, as regulated assets, will ultimately be funded through public money. The UK Government has pledged to establish a £400m fund to support the rollout of charging infrastructure, a commitment it reaffirmed in its recently published policy paper 'Reducing emissions from road transport: Road to Zero Strategy.' Nevertheless, the question remains whether the Government's commitment and ambition is sufficient to drive the scale of investment required.

Ultimately, however, we believe the place to look is the fleets. These present a unique opportunity: reduced demand risk, opportunity for cost reductions through volume purchases, as well as opportunity to cross-sell multiple products and, in turn, TCO parity for car and van fleets can be expected as early as 2020. At KPMG, we expect to see a major fleet make a game-changing investment to drive EV adoption and EV infrastructure investment forward. There is a big opportunity to grab first mover advantage. Many players are proceeding watchfully in the slow and middle lanes – but who will be the first to move into the fast lane and bring the EV market the shot of electricity it needs?

Find out more here:
kpmg.com/uk/Mobility2030FS

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