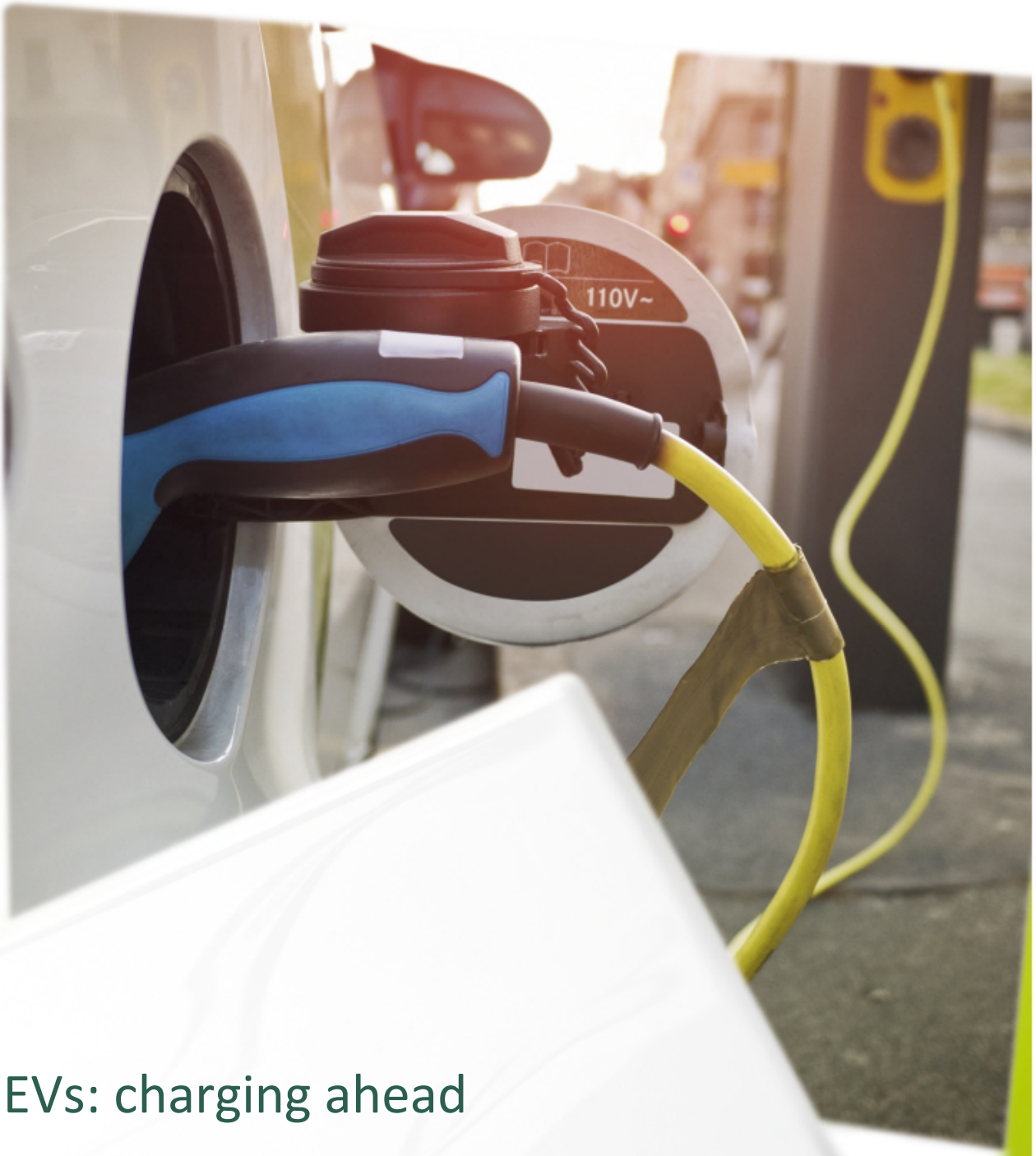

EVs: charging ahead

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Hogan Lovells

Alex Harrison
Partner, London
T: +44 20 7296 5853
E:alex.harrison@hoganlovells.com

Alex Harrison, energy partner at Hogan Lovells, assesses the challenge of achieving critical mass in electric vehicle (EV) charging infrastructure.

The UK Government has published its Road to Zero strategy paving the way for a significant expansion of on and off-street EV charging facilities in the UK.

The electric vehicle revolution is happening and the revenue streams and technologies available are driving the emergence of different business models and opportunities for the roll-out of EV charging infrastructure.

Revenues and business models

Potential charging revenues include direct sale and installation fees, user charging fees (on either a pay as you go or subscription basis), a wide range of retail revenue opportunities "while you wait", alignment fees from automotive sector players keen to support roll-out and vehicle to grid (V2G), vehicle to business (V2B) and vehicle to consumer (V2C) electricity off-take revenues.

Direct sale and installation models involve partnerships with local authorities, retailers, hotel chains, corporate landlords, property developers or the automotive industry. Swedish power company Vattenfall is one business offering solutions in this space as is the UK's PodPoint which is preferred supplier to Jaguar Landrover UK, Mitsubishi Motors UK and Nissan Norway. The charge points for these solutions tend to be slow (3 kilowatts (kWs)) with 6-12 hour charge times or fast (7-22kW) with 3-4 hours charge times. Charging may be offered free to use in support of the host's sustainability agenda or as a loss leader to attract footfall and increase dwell time.

User charging models can be built around fast (7-22kW) charging solutions in locations such as shopping centres or car parks, where cars will be parked for more than an hour. For motorway service and petrol stations, rapid (43/50kW+) charging solutions, from companies like Instavolt and Gridserve, offer an 80 per cent charge in around 20-30 minutes. At the top end of the market, ultra-fast (350kW) charge points like the new 350 kW Terra HP from Swedish-Swiss multinational ABB offer 200km of range in 8 minutes.

Rapid and ultra-fast charging solutions can be viable on a user fee only basis or may align naturally with significant retail revenue opportunities (such as the sale of traditional forecourt items, advertising, parcel collection, connectivity and media services), particularly where located in a quasi-monopolistic location such as a motorway service station. The extended charge time, when compared to a traditional petrol or diesel refill, offers enhanced retail revenue potential and may, in time, trigger a redesign of service station retail offerings to accommodate the longer user journey.

Automotive sector alignment fees seek to capture the natural interest from the automotive sector in ensuring both a route to market for EVs and that a shortage of charging points does not inhibit EV uptake by businesses and consumers. Projects such as the MEGA-E charging project being developed by investment fund Meridiam, which is seeking to install 322 ultra-fast (350kW) chargers and 27 smart charging hubs throughout 20 European countries, are exploring the potential to include an alignment fee component in their structure.

V2G revenues can be generated through the software aggregation of car batteries (with companies like Pivot Power also planning to combine them with static battery storage), operating them as a virtual power station and seeking to arbitrage the power price and to sell balancing services, such as frequency response, to the grid.

This is already an established market for non-EV battery and other storage, where in Great Britain companies such as Belectric are contracted to provide enhanced frequency response services to National Grid. EVs offer enhanced potential (and value to the grid) for these services with the potential for location specific supply bringing power onto the grid in the places it is needed thereby avoiding the costs of moving it around the system and circumventing existing grid constraints, which may allow some grid reinforcement capital expenditure to be deferred or avoided.

V2B revenues involve the sale of power and wider "energy as a service" solutions to corporates behind the meter (ie off-grid). This creates an opportunity to arbitrage the wholesale and retail price of power, to avoid system costs (for example by using EV power supply to peak shave, taking the corporate off-grid at times of peak load where systems costs are highest) and to generate revenues through a share of energy efficiency savings arising from effective energy management. Companies such as Marubeni Corporations SmartestEnergy are active in this market.

V2C revenues are similar to V2B opportunities, but targeted at residential rather than commercial users, for example by offering an integrated solar, battery and EV energy management solution to householders. Businesses such as LightsourceBP through its Lightsource Labs are developing solutions in this space.

The sale of power to the grid or behind the meter offers a huge potential additional revenue source for EV charging providers, but bi-directional power flow through an EV battery has the potential to degrade performance and lifespan on the EV battery and it remains to be seen if and how the vehicle or battery owner will be insulated from this risk and rewarded for its role in facilitating the sale of power and power services to third parties.

Scaling

The EV charging market is likely to consolidate significantly over time and the survival of existing and new business models will ultimately depend on their ability to scale. This will be driven by how robust a technology, cost, revenue, cash-flow and growth story these businesses can sell. For some, the endpoint will be absorption within an energy, automotive or technology major (indeed this is already happening with Shell's acquisition of NewMotion in October 2017 and BP's acquisition of Chargemaster in June 2018). For others, the key to their survival may lie in whether they can attract leverage: progressing from venture capital and private equity finance to structured, project finance, institutional or other debt solutions.

Debt financing offers huge potential to support the scaling of EV charging infrastructure to critical mass, but for deals to be bankable lenders' exposure to merchant, obsolescence and grid connection cost risk will need to be effectively managed or mitigated.

Many EV charging business models have inherent exposure to demand risk, relying on charge points being in the right locations to attract vehicular footfall and exposed to the risk that lower than expected EV uptake, faster than expected increases in EV range, or the presence of competitors charging solutions will negatively affect demand for their services.

Commercial and public utility fleet solutions offer perhaps the best solution to managing demand risk and therefore the greatest early potential for debt financers. Debt can be used to support the installation, operation and maintenance of EV charging points at fleet depots (for example a depot for last mile deliveries or street cleaning or waste collection vehicles) or charging hubs (for example, for a ride sharing company) with demand for the charging infrastructure underpinned by a long term commitment from the credit worthy fleet host. This type of solution could also be applied behind the meter, for example, in a long stay airport carpark with power from the vehicles used to take the airport off-grid at peak times.

Another key area for lenders is exposure to wholesale electricity prices and how this is passed on to end customers. It remains to be seen whether user charging fees will track underlying wholesale prices in the way in which petrol and diesel prices track the oil price or whether consumers will expect greater cost certainty mirroring the way in which existing residential electricity supplies are provided. At this stage, it seems unlikely that the UK Government will intervene to remove exposure to wholesale electricity price risk for charging infrastructure providers in the way that it has done for low carbon electricity generators through the contract for difference.

In such a fast moving environment, obsolescence risk will also need to be managed to ensure that demand for installed charging infrastructure does not materially reduce or evaporate due to better charging solutions being available within an acceptable distance.

On the cost side, a significant risk for EV charging providers is site selection, which requires developers to triangulate market-wide future EV uptake, range and charging speeds, site demand profile and site costs for obtaining an unconstrained grid connection (and the extent to which the connection can be future-proofed at an acceptable and predictable cost to allow upgrading to more rapid or ultra-fast charging infrastructure mid-way through a project's life). In the UK, grid connection cost is one of the great uncertainties for EV charging providers as it depends on the local constraints with the cost of any required reinforcement measures passed through to the connecting off-taker or generator.

A supportive policy backdrop

The UK has a supportive policy framework for EVs and EV charging. Highways England has a target of ensuring there is a charge point every 20 miles along the strategic road network by 2020 and the UK Government offers a range of grants to support the installation of domestic, workplace and on-street charge points.

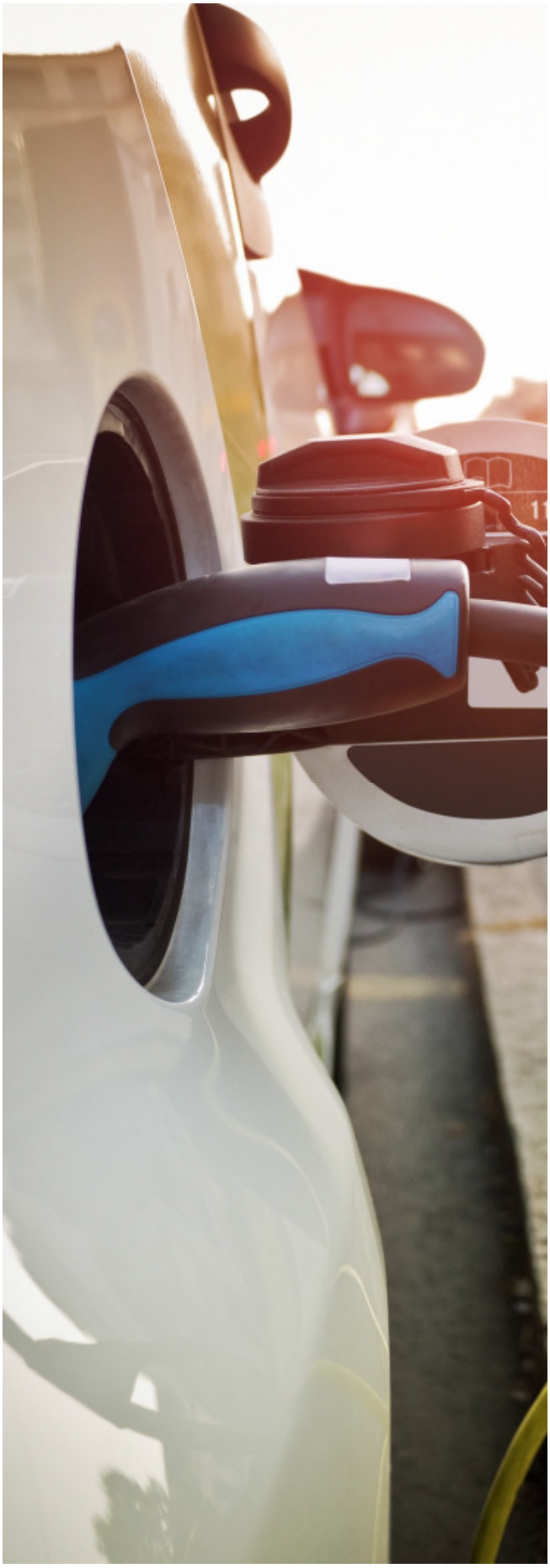
The Road to Zero confirms the UK government's plans to end the sale of all new conventional petrol and diesel cars and vans by 2040 and to launch a £400 million Charging Infrastructure Investment Fund (CIIF) with £200m of UK Government investment to be matched by £200m from the private sector. The CIIF is likely to attract interest from a number of investment fund managers, particularly those, such as Amber Infrastructure, who have a strong track record in government backed investment funds.

The Road to Zero also announces consultations on requiring charging facilities to be installed in new dwellings and non-residential buildings, plans for ensuring that all new street lighting columns have charging points and an increase in the funding available for workplace and on-street residential charging.

In the background, The Automated and Electric Vehicle Bill aims to ensure the adequate provision of charge points at motorway service stations and large fuel retailers, open access to and information about charge point locations, harmonised technical standards and interoperability and the roll-out of smart charge points able to interact with the electricity network. This last bit is important as EVs are expected to create an extra 18GW of electricity demand in the UK by 2050 (30% above today's peak demand). Automated smart charging and consumers incentivised to charge off-peak will be key to managing the impact of EVs on the grid.

Conclusion

EV charging infrastructure is set to emerge as a new standalone asset class. Success will come in different forms with distinct approaches to residential, workplace, commercial, fleet, service station and on-street charging. The winners will be those best able to manage and mitigate key EV project risks to enable them to scale by attracting investment and finance.



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