Hogan Lovells

EV Charging – A new asset class

More than 120m full battery and plug-in electric vehicles are forecast to be on the road in the UK, Asia and the USA by 2030.

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The UK has accelerated its transition to electric vehicles (EVs) through a series of policy measures including a commitment to end the sale of all new conventional petrol and diesel cars and vans by 2040, and may bring that date forward to 2035, and legislation to deliver net zero greenhouse gas emissions by 2050.

In March 2020, the UK government announced a comprehensive electric vehicle charging infrastructure review and £500m of funding to support the roll-out of a rapid-charging network, ensuring that EV drivers will never be further than 30 miles from a rapid EV charging station.

These EVs will need access to power through a network of millions of charge-points and a smart new EV charging ecosystem that manages the impact of that charging demand on the national electricity network.

The mobility revolution is gathering pace and creating new business models and the emergence of a new EV charging asset class for investors and lenders. Project finance has a key role to play, but will need the sector to mature before it can become a significant source of liquidity for EV charging infrastructure.

Demand for EVs

Although there is momentum in the market, the pace of EV uptake remains uncertain and is influenced by a range of factors including national government policies, in support of the transition to low emission vehicles, and broader decarbonisation targets; the length of time it takes to reach price parity between EVs and traditional internal-combustion engine (ICE) vehicles; vehicle range and range anxiety, ie public perceptions about the ability to use EVs for longer distance journeys; and availability of public charging stations, ie public perceptions about the availability of cost and time-effective public charge-points in the right locations so that a lack, or perceived lack, of charging infrastructure is not an impediment to consumer decisions to switch from ICE vehicles to EVs.

Demand for EV charging infra

The speed – slow, fast, rapid, ultra-rapid – and location – home, work, destination and en route – of the charging ecosystem required to support the growth in EVs also remains uncertain.

Most forecasts assume a fundamental shift from fuelling en route, as we do now, to charging for a significant portion of the time at home, but the optimal charging hierarchy will vary from country to country and, within countries, from cities to rural areas, driven particularly by the extent of residential access to off-street parking and the prevalence of commuting journeys by car to office locations with available workplace parking.

In simple terms, more public, ie on-street, destination and en route, charging infrastructure will be needed in locations with lower levels of residential off-street parking or where commuters travel to work using public transport or are unable to park at their workplace.

The charging ecosystem that we plan today will also need to take account of the emergence of ridesharing models, where personal car ownership levels are reduced and mobility becomes a service, and of the expected shift to autonomous vehicles.

In both of these cases annual mileage per vehicle, and therefore charging demand, is likely to increase significantly and the optimal charging footprint – speed, frequency and location – will change.

EV Charging revenue models

A variety of EV charging solutions will be needed and their revenue models will differ by EV charging speed and location.

Home charging solutions will involve the direct sale of power and smart charging, to time shift charging to lower energy tariffs. Where off-street residential parking is available, these solutions will combine broader energy as a service (EaaS) solutions, optimising domestic power consumption and energy efficiency by providing homeowners with an integrated and managed energy solution combining EV charging, solar generation and battery storage.

Workplace charging solutions may be offered to employees free at the point of use as part of a broader sustainability or employee benefits package, or may be integrated into a wider EaaS offering, optimising corporate power consumption and energy efficiency by integrating intelligent building energy management systems with EV charging, on-site renewable generation and battery storage and allowing the solution provider to share in the energy savings created and the direct sale of power generated to the workplace, to a nearby corporate or to the grid.

Destination charging solutions will differ depending on the typical destination dwell time, 1–2 hours for supermarkets and shopping centres and overnight for hotels. Their revenue model will be primarily based on the direct sale of power, potentially at a premium, from fast charging, 3–4 hours, although they may initially be offered to customers free at the point of use as a loss leader to attract footfall and increase dwell time.

En route charging solutions will offer access to rapid, 20–30 minute, or ultra-rapid, 8–10 minute, charge points and combine the direct sale of power at a premium with significant and enhanced retail revenue opportunities – such as the sale of traditional forecourt items, food and refreshments, advertising, parcel collection, connectivity and media services – due to the extended charge time, 20–30 minutes, when compared with a traditional petrol or diesel refill.

A major potential source of potential additional revenue for home, workplace and some destination charging solutions, such as long-term airport car parks, is the supply of power from vehicle to grid (V2G), vehicle to business (V2B) and vehicle to home (V2H).

V2G revenues could be generated through the software aggregation of EV batteries combined in some cases with co-located static battery storage, operating the EVs 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 energy storage in Great Britain. 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 most 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 EV battery power to corporates behind the meter, ie off-grid. V2B is often part of a wider EaaS solution and 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.

V2H 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 households. As with V2B, V2H is likely to be offered as part of a wider integrated EaaS solution.

Although the sale of EV power to the grid or behind the meter offers a potential new and additional revenue source for EV charging providers, bi-directional power flow through an EV battery requires a more expensive bi-directional EV charge-point and has the potential to degrade performance and lifespan on the EV battery.

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.

A smart EV charging ecosystem

The EV charging ecosystem developed to support the expected exponential growth in EVs will need to be smart to time-shift and smooth out the load on the energy system and avoid a significant increase in peak load on the national electricity network – for example if people return from work and all begin to charge their EVs at the same time. Smart charging will also facilitate interoperability between vehicles, support the creation of an energy-efficient, low carbon and lower cost energy system, allow interaction between EVs and other smart devices in the home/workplace, eg battery storage and solar generation, enabling the delivery of EaaS solutions and allow EVs to be aggregated and to operate as virtual power stations delivering V2G, V2B and V2H services.

Financing EV charging roll-out

The EV charge-point 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, cashflow and growth story these businesses can sell.

For some, the end-point will be absorption within an energy, automotive or technology major. Indeed, this is already happening with Shell's acquisition of New Motion in October 2017, BP's acquisition of Chargemaster in June 2018 and EDF's acquisition of Pivot Power in November 2019 and PodPoint in February 2020.

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, and project financing in particular, 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 understood, managed and 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 depot – for example a depot for last mile deliveries or street cleaning or waste collection vehicles – with demand for the charging infrastructure underpinned by a long-term commitment from the creditworthy 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.

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.

Grid connection cost can be one of the great uncertainties for EV charging providers, particularly in markets where, as in the UK, the connection cost depends on local constraints with the cost of any required grid reinforcement measures passed through to the connecting offtaker or generator.

EV charging infrastructure and related EaaS solutions are emerging as a new asset class. There is no one size fits all approach. Success will come in different forms with distinct solutions for home, workplace, destination and en route charging.

The winners will be those best able to build a loyal customer base, monetise ancillary revenue streams alongside core power sale revenues, and manage and mitigate key EV and EaaS project risks.

At present, in the absence of a creditworthy, anchor customer providing a medium to longterm demand commitment to the EV charging solution provider there is insufficient revenue and cost certainty in EV charging solutions to make them bankable for project finance lenders.

There is huge enthusiasm for the sector, however, and, as the market matures, costs will stabilise and become better understood, and charge-point operators will build up their customer subscriptions and track records, increasing confidence in levels of charging demand.

Equity and debt will be needed to deliver the expected infrastructure investment to support EVs as a dominant mobility solution and project finance investors are waiting in the wings to welcome EV charging into the ever expanding envelope of infrastructure.

If you have any questions or would like to talk about anything mentioned in this article, please let us know.

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