EV:Ready Facilitates Strategic Implementation of Charging Infrastructure

Accelerating the shift to electric vehicles at the neighbourhood level

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Local authorities play a key role in electric vehicle (EV) uptake. Identifying infrastructure opportunities at the neighbourhood level and pursuing them at the right time are essential steps to support and accelerate successful transitions. In the following Q&A, members of the WSP Future Mobility Team discuss how application of the WSP EV:Ready modelling tool supports local authorities (cities, small towns and rural areas) and other transport decision-makers in the public and private sectors as they prioritize locations for investment and plan implementation of charging infrastructure. This tool was developed by WSP in the UK but is applicable to locations around the world.

What is EV:Ready?

Daniel Quan – EV:Ready is a modelling tool that has been developed over the past five years to forecast electric vehicle uptake and charge point requirements for a chosen study area, between now and 2050. It supports decision-makers who need to understand the scale of investment required in the transition to electric vehicles. The overall EV:Ready approach [Figure 1] aims to answer a number of key questions that public and private stakeholders face.

The tool enables flexible EV uptake scenario forecasting at a neighbourhood level and provides details relative to the electric vehicle charge point (EVCP) requirements for the chosen study area. It also provides insight regarding potential locations for public or private sector charge point investment.

It accounts for socio-demographic variations in neighbourhoods and identifies infrastructure requirements to inform a wide range of contexts—a single site such as a shopping centre or across a region. It can be applied area-wide for local government, to local sites for developers and landowners, or to a networks of sites for prospective investors.

The tool also considers where it is commercially viable for the private sector to invest in charge points and subsequently where gaps in provision will occur; these gaps may need to be filled by the public sector to ensure there is equity of provision for publicly accessible charging stations.

This information allows local governments to plan their rollout of EV charging infrastructure. For private companies, there is increasing pressure to provide infrastructure that is able to support the particular charging needs of users at each site, depending on differing dwell times. The EV:Ready tool can predict the volume of vehicles which would choose to charge if the facility were available.

The EV:Ready approach

Opportunity to shift modes — Which car trips could be made by active and sustainable modes?

Baselining — What is the baseline situation?

UK EV sales trends — How might EV uptake increase into the future in the UK?

Uptake scenario development — What are the likely EV growth scenarios going forward?

EV uptake forecast — How might this translate into EV growth at a local level?

EV demand forecast — Where will there be the highest EV charging demand?

EV supply forecast — How attractive is this area for installing charge points?

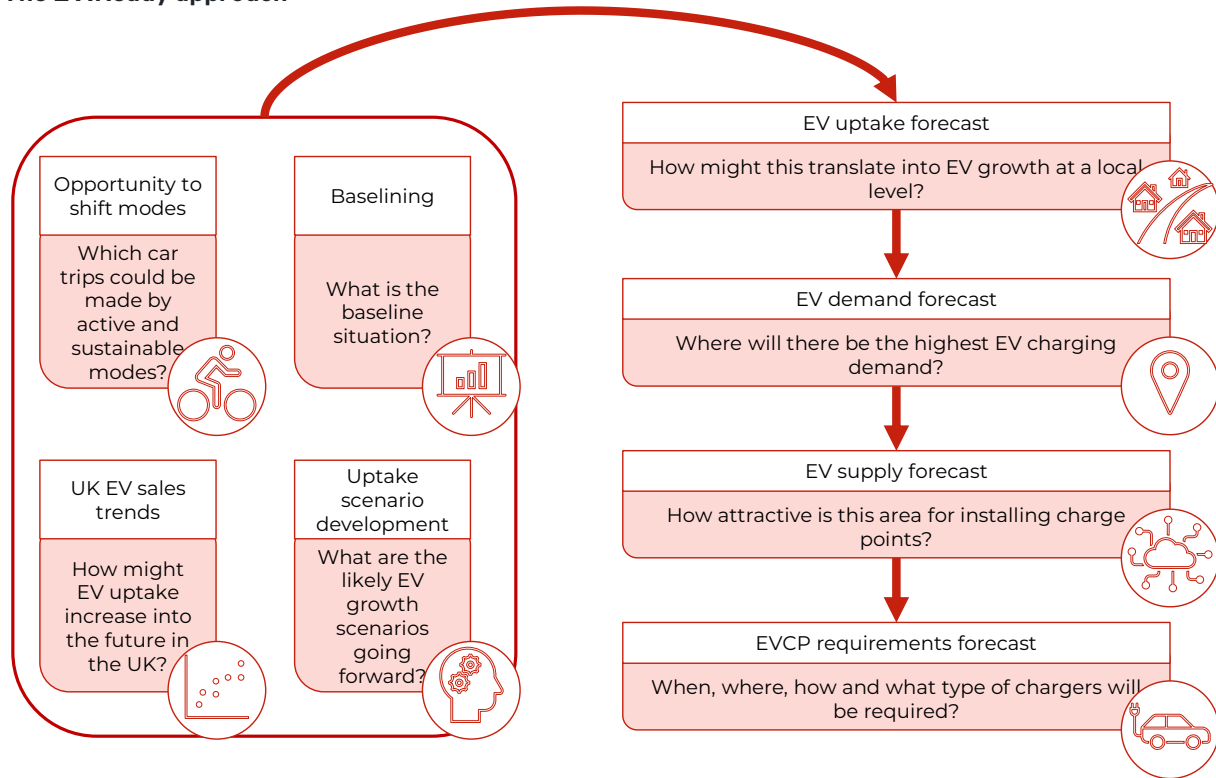**EVCP requirements forecast** — When, where, how and what type of chargers will be required?

Figure 1 – Inputs (on the left) are reviewed and adapted where necessary, then they feed into the methodology process (on the right) to provide bespoke outputs on a project-by-project basis.

Can you cite an example of EV:Ready application to demonstrate how the tool is helping with transportation plans?

Holly Frost – EV:Ready has been used to support Midlands Connect with developing its EV infrastructure agenda since 2020, covering a range of commissions to help accelerate EV uptake across the Midlands region in the UK. Work included the development of technical guidance for charge points and an approach to the monitoring and evaluation of charge point delivery. An industry-leading paper, *Supercharging the Midlands*, was then published—where the vast majority of content was as a result of the technical work—and a WSP-sponsored conference took place in the spring this year to spark engagement between Government, local authorities and industries on how a collaborative approach and innovative commercial models can accelerate EV uptake.

Following the application of EV:Ready, the WSP economics team developed a business case for charging infrastructure across the Midlands, where potential benefits from public sector investment in charging infrastructure was monetized to determine the value of the investment.

In addition to being used to support sub-national transport bodies, EV:Ready has helped several local authorities and counties with the development of their EV strategies. In 2021, EV:Ready was used to support Norfolk County Council [NCC]. A study was undertaken to identify the measures NCC and the districts within the county should be taking to successfully deliver EVCP rollout. As a result, 25 recommendations were provided to NCC in the form of an action plan, setting out the Council's role, who should be leading and the recommended timescales for delivery.

How can the public sector and private sector work together to support equitable solutions in communities?

Toby Thornton – In order to provide the volume of publicly accessible EVCPs needed to support the forecasted uptake of EVs, both the public and private sectors will need to invest in infrastructure.

The private sector naturally focuses on areas of higher demand for EV charging where they can guarantee higher utilization rates. These sites are the most profitable and will ensure a stronger and more immediate return on their investment.

EV charging is almost always paid for per kilowatt-hour, so the higher the utilization, the more profitable the EVCP. The areas of highest demand are generally focused along busy roads where en-route charging demand is highest (similar to the location of fuel stations), urban areas or at high footfall destinations, such as town centres, railway stations and supermarkets, where top-up charging will occur. Top-up charging has a higher turn-over of vehicles and higher utilization rates.

Conversely, rural and lower-density residential areas away from the strategic road network may be less attractive to the private sector due to lower traffic and associated lower utilization rates. These areas are where the public sector may tneed o provide EVCPs.

Initially the investment by the public sector will be far greater. Over time, as demand increases, costs fall and commercial viability improves, the ratio of publicly funded to privately funded chargers will shift.

Based on discussions with charge point operators in the UK, by 2030 it is anticipated that approximately 50 percent of fast chargers and 10 percent of rapid chargers will still require some degree of public funding, with the remainder fully funded by the private sector. If the public sector does not intervene to plug gaps in provision and ensure a reasonable level of coverage, then the uptake of EVs in some areas will be restricted. Publicly funded networks are needed to support an equitable distribution of EVCPs and fill the gaps identified in the network.

What are the key considerations when forecasting EV charging demand for different land uses?

Daniel Quan – EV charging activity currently takes place across destination, en-route, residential or workplace charging locations. Where drivers and businesses ultimately choose to charge depends on a combination of availability, reliability, price and convenience.

Given the extensive inputs into EV:Ready, including granular socio-demographic data, the tool is able to model the behavioural decision-making that manifests as demand for different EVCP types. Key considerations differ among charging locations. Destination-based charging will be typical of places that have long dwell times and consider the user experience; these include municipal car parks, retail and leisure destinations. En-route charging is centred on convenience and being along the most accessible strategic highway locations; therefore, rapid chargers are best suited in these locations. Residential and workplace charging is typically slow to fast charging, bespoke to an individual or set of tenants needs.

What new challenges might a maturing EV market bring in EV infrastructure delivery, and in what ways can the tool continue to support progress?

Toby Thornton – As the EV market matures, it will need to be considered within the wider mobility, digital and energy ecosystem in which it operates. As an example, EVs need to fit with the broader travel demand and decarbonisation agenda. It is a missed opportunity if we encourage a one-for-one shift from internal combustion engines to EVs.

Chris Jackson – As Toby noted, it is crucial for EVs to be considered within the wider energy context given that they will impact the demand for electricity. Does the local area have the energy capacity to accommodate the forecasted charging demand, or are significant and costly grid improvements required? Is the electricity provided to the charge points green or from polluting

sources? If the latter, then we are merely transferring the emissions to another location.

The value is when we align these recommendations with insights on the on-site power and available grid capacity to ultimately determine when and how viable the deliverability of EVCPs will be. Around 33-50 percent of prime sites typically do not have

sufficient electrical capacity, and the cost of upgrading the connection will likely make them unattractive for private investment. This is where the public sector would be needed to fill the gap.

Toby Thornton – Also, opportunities should be sought to shift trips to active travel and public transport where possible. In highly accessible town centres, where walking, cycling and public transport is preferred, authorities may decide to prioritize charge point provision to serve taxis and commercial fleets rather than supporting use of privately owned EVs. Such a decision is obviously context specific, but this example gives some understanding of the difficult policy questions that will need to be answered going forward. The rapid electrification of commercial vehicle fleets will become an increasingly important consideration across EVCP networks, and the requirements for commercial vehicle fleet charging will need to be considered as the uptake increases.

EV:Ready provides transport organizations and other stakeholders with propensity forecasting to help them make informed decisions. For public sector organizations, it can identify areas to focus investment to unlock EV demand and support EV strategy development, funding requests, prioritization and implementation. For both public and private sector stakeholders, EV:Ready can help reduce uncertainty in decision-making and identify when and where to focus investment.

▶ Continue here to learn how system dynamics shapes informed transportation plans.

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Daniel is an Associate Director with over 12 years' experience. He has worked across the UK and Australia, focusing on multimodal transport and land use planning projects for large master planned developments, electric vehicle strategies, cycle projects and plans, and travel behaviour change initiatives. He led the development of the EV:Ready tool which has been used on over 25 EV projects across the UK to help public and private sector stakeholders understand likely EV uptake between now and 2050, and how to plan and accommodate that future growth.

Holly Frost
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Holly is a Consultant in the Future Mobility team with over three years' experience. She has vast spreadsheet modelling skills, having been one of the co-developers of the EV:Ready tool. Holly has extensive experience in the development of economic and financial cases, specifically with the development of economic appraisals for a range of transport schemes.

Toby Thornton
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Toby is a Technical Director and private sector lead for Future Mobility in the UK, working at the leading edge of future mobility and transport decarbonization projects both within the UK and internationally. Toby has led a number of EV studies for investors and asset owners with a specific focus on EV uptake, user behaviour and the business case.

Chris Jackson
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Chris has 15 years' experience of relationship management in fleet and has led projects creating total cost of ownership models, developing strategies to promote uptake, planning home and workplace charge point infrastructure deployment and reviewing technological developments.