

ELECTRIC VEHICLES

From petrol stations to charging stations



The availability, or lack, of public charging stations will have a strong influence over the global take up of electric vehicles – especially in urban areas. *Jennifer Johnson* looks at whether charging logistics can match up with electric ambitions.

With sales of electric vehicles (EVs) on the rise – and battery prices continuing to fall – it's safe to say that the future of mobility is electric. Across the world, policymakers are increasingly willing to legislate for the end of the internal combustion engine. Even the US, which has the highest number of cars per capita of any major economy, is newly embracing the shift away from petrol-powered vehicles. President Joe Biden's \$2tn infrastructure and jobs plan, announced in late March, notably includes \$174bn in support for EVs.

The funds will help to modify factories for electric vehicle production and strengthen domestic supply chains, as well as supporting the installation of 500,000 EV charging stations in the next 10 years. Biden's plan seems ambitious in light of the fact that only around 2% of cars in the US are currently powered by electricity – but whether they are enough to help the country meet

its emissions targets is another matter. Germany, by way of comparison, is aiming to install 1mn EV charging stations by 2030.

Charging concerns

The tricky logistics of charging appear to be putting US car buyers off of EVs for the moment. Data from YouGov released last year showed that only 21% of Americans likely to buy a vehicle in the next year would consider a fully-electric model. Hybrids didn't fare much better, with 31% of respondents saying they'd consider purchasing one. The top deterrents cited were charging time (21%) and the hassle of charging (20%) – though 17% of respondents said that an outright lack of charging stations was a factor.

The transition to electric mobility could be a bumpy one if incentives for manufacturing and buying EVs fail to align with the speed of the rollout of charging infrastructure. This potential imbalance isn't unique to the United States, either. In a report

released earlier this year, UK think tank Policy Exchange said that the annual rate at which charge points are being installed in the UK must increase from 7,000 to 35,000 over the next decade. Any slower, and the country may not be able to meet demand for charging when new combustion-engine vehicles are banned in 2030.

To stimulate growth, Policy Exchange recommended that the government launches competitive tenders for charging point networks in places that are underserved. This process, the report's authors say, is similar to the auctions for offshore wind farms that made the industry such a success in the UK. However, significant uncertainty remains over how many EV charge points should be considered 'adequate' in a given area – and the answer depends on local factors, including the availability of home charging.

Local solutions

In a working paper on urban charging infrastructure released last August, the International Council on Clean Transportation (ICCT) noted that housing stock plays a strong role in determining how many public charge points are needed. Cities with more residents in multi-unit homes will naturally need more public charging stations than cities with lots of single-family houses and access to private home charging.

According to the ICCT, metropolitan regions in the Netherlands have the highest levels of charging availability and the lowest ratios of electric vehicles per public charger – somewhere between two and seven.

More than one third of Dutch residents live in multi-dwelling or apartment-style housing without access to home charging. This has resulted in demand for public charging from vehicle owners – and local governments have obliged. Amsterdam was the first Dutch city to build out curbside EV charge points, in partnership with power firm Nuon, and its model has subsequently been replicated in Rotterdam and Utrecht.

After the initial rollout, drivers in Amsterdam were given the option of requesting a new public charge point online, with Nuon subsequently assessing whether it's needed. Considerations include the location of the nearest existing charge points and the occupancy rate of other nearby charging stations. Ultimately, Amsterdam

London could need as many as 4,000 rapid charging points by 2025.

Photo: Osprey

City Council gets to decide whether to install a new charge point.

Successful as this scheme has been, the ICCT report also notes that Dutch cities with large numbers of apartment dwellers also have lower rates of car ownership, meaning that the charge point per vehicle ratio is inherently low.

Outside of the Netherlands, major cities like London and New York have turned their attention toward installing hubs with multiple fast-charging stations. As of the start of this year, London had over 500 rapid vehicle charging points – primarily designed for use by commercial vehicles – and 5,500 residential charge points.

But the city's public sector, and its private sector partners, are going to have to speed installations up if they hope to achieve net zero emissions by 2030. The Mayor's own *Electric Vehicle Infrastructure Delivery Plan* estimates that by 2025, London could need as many as 4,000 rapid charging points and 48,000 residential chargers.

New York City is currently in the process of expanding its own fast-charging network. The City set aside \$10bn to install rapid chargers, which can charge an EV in just 30 minutes, in all of its

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boroughs. Officials aimed to have 50 such fast-charging stations put in place by the end of last year.

Rapid charging makes sense for densely-populated areas, as a single fast charger can serve many more vehicles than a slower one. But the greater the power on offer, the higher the price of a charger will be. Municipal authorities will have to weigh up the cost and utility of rapid charge points when allocating resources to their charging networks.

Public versus private charging

Important as public charging availability is, home charging remains the most cost-effective option for powering up an EV. An investigation by the UK's *What Car?* magazine found that using the country's fastest EV chargers can cost around seven times more than charging at home. While governments plan their public charging networks, they should also consider offering incentives to encourage drivers to charge at home.

The ICCT cites the example of Oslo, which discovered it was less expensive to provide financial help for home charging infrastructure than it was to heavily subsidise additional public charging. The city

channelled its resources toward multi-unit dwellings – offering a grant to cover 20% of the total costs of installing adequate charging. The city provided assistance for some 16,000 private schemes in 2018.

Norway is renowned for subsidising the costs of both buying and running an EV – the vehicles are exempt from both purchase tax and VAT, and drivers pay half price tolls and parking fees. As a result, nearly 70% of the cars sold in the country last year were powered by electricity.

Research group BloombergNEF recently predicted that electric cars and vans will be cheaper than petrol or diesel alternatives across Europe by 2027, as battery costs continue to fall, production increases and new vehicle designs are developed. The study also predicted battery electric cars and vans could account for all new European sales by 2035, if policymakers increase carbon dioxide emissions targets and commit to a faster rollout of charging points.

As costs fall, the case for buying an EV gets stronger. But this must ultimately be matched by the convenience of running one. ●



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