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## **Electric Vehicles: leading the way on inclusively designed charging infrastructure**

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### **Executive Summary**

As the deployment of public electric vehicle (EV) chargepoints accelerates across the UK, disabled and older drivers, passengers and pedestrians have experienced challenges accessing this infrastructure. In response to these challenges, in 2021 the UK Government and disability charity Motability commissioned the British Standards Institution (BSI) to develop PAS 1899, a world-leading national standard for the provision of accessible, inclusively designed EV infrastructure. PAS 1899 was published by the BSI in October 2022. This paper considers the importance of addressing inclusivity and accessibility early in market development, and the UK's experience of doing so through innovative standards.

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## **1 Importance of accessible charging infrastructure in the UK**

The UK Government has committed to phasing out the sale of new petrol and diesel cars and vans by 2030 and from 2035, all new cars and vans must be zero emissions at the tailpipe. As the transition to EVs accelerates and the charging network expands and evolves, it is essential that public chargepoints are designed such that they are easily accessible to all those who need to use them, including disabled and elderly people. Embedding good practice and encouraging chargepoint providers to design inclusively from the outset is central to achieving this; doing so will also help avoid costly and logistically complex retrofitting.

This is an important consideration for the UK Government while developing policy levers to support the rollout of a robust public charging network, as without action, the scale of the potential problem is significant. One in five people in the UK self-report a disability [1]. Analysis indicates that by 2035 there will be 2.7 million disabled drivers in the UK, with up to half – 1.35 million [2] – either wholly or partially reliant on public EV chargepoints. The UK Government is aware that the majority of EV charging takes place at home, a trend which it expects to continue; disabled people are less likely to have off street parking, and will therefore be more reliant on public charging infrastructure.

Based on existing evidence, including previous government consultation [3, 4], existing public chargepoints in the UK are often not designed with the accessibility needs of disabled and older users in mind. Challenges commonly faced include charging units being of a height unsuitable for wheelchair users, charging cables being too heavy and/or cumbersome to lift and manoeuvre, and connectors requiring a high level of force to use; as well as features of the streetscape such as the size of the parking bay or height of the kerb. In addition, users can struggle to locate chargepoints suitable for their needs and plan their journeys, owing to a lack of accessibility information provided through open data [5].

The current lack of accessible charging infrastructure may already be having significant impacts on elderly and disabled consumer's confidence in making the transition to an EV. Industry research indicates that only 25% of non-EV drivers would consider driving an EV now, in comparison to 61% if charging was made more accessible [6].

## 2 Development of PAS 1899

There is increasing interest from parties in how to design public chargepoints inclusively, and different solutions are emerging at a local level across the UK. Calls had been growing across industry and other parties for standardised definitions of what accessibility means for public chargepoints and guidance on how this can be deployed. The UK Government has received indication that chargepoint rollout from some parties may have been delayed, to prevent the installation of chargepoints which may be considered inaccessible.

In response, in 2021 the UK Government and national disability charity Motability announced a partnership [7] to commission a world-leading national standard for accessible public EV chargepoints. This standard was developed by the British Standards Institution (BSI), the UK's national standards body, and is known as *Publicly Available Standard 1899:2022, Electric vehicles – Accessible charging – Specification* ('PAS 1899') [8].

PAS 1899 is a technical standard which will support chargepoint procurers – including local authorities, chargepoint operators, landowners or leaseholders – to understand the basic and best practice guidance for the design and installation of accessible public chargepoints, and adjacent parking relevant to the chargepoint location. PAS 1899 is applicable to all public chargepoints, but some criteria are only applicable in specific circumstances, and therefore recognises the following scenarios: low-powered off-street; high-powered off-street; low-powered on-street; high-powered on-street.

The development of PAS 1899 was a challenging undertaking owing to the inherent complexity of the EV charging landscape, the novelty of the area and relative lack of available evidence to underpin some key metrics. Extensive engagement with multiple actors was required to reach consensus on the final specifications, as well as roles and responsibilities for delivery. The end user was involved at every stage of the development of PAS 1899, and results from user testing with disabled people were drawn upon wherever possible. The steering group that informed the standard was made up of over 20 organisations, and included representation from disabled people, disabled people's organisations, disability charities, industry bodies, transport agencies, central government and devolved administrations, and chargepoint providers.

Within PAS 1899, accessibility is considered “in relation to users, drivers and passengers, and others nearby, and in relation to disabled people, people of other protected characteristic groups, and including older people and those with children” [8]. Whilst the needs of disabled people were a significant driver for the standard, the benefits of adopting the specifications within PAS 1899 have the potential to improve the experience of public charging for many, if not all, consumers.

PAS 1899 includes factors to be taken account of in the physical design of accessible chargepoints and their immediate surrounding areas. This includes criteria on the height of chargepoints and their features, ensuring that the socket outlet, charging cable, visual interface and payment terminals are useable by all consumers whether in a seated or standing position, including those which are wheelchair users, require use of mobility aids, are of short stature and those with dexterity impairments. Guidance on the length and weight of chargepoint cables is also included in PAS 1899, supporting useability and manoeuvrability of cables for individuals with varying strength and dexterity abilities. Other guidance included relating to chargepoint design includes bollard spacing, interface tilt, colours used, accessibility of language within communications, and general ease of use of the equipment.

The specifications also include physical aspects of the environment surrounding fixed chargepoints (e.g. kerb height, ground type) and the location, placement and spacing of chargepoints within the streetscape and relative to other infrastructure and/or objects. This will vary depending on the specific scenario of where the chargepoint is located. It is necessary to consider the streetscape in this context, to ensure that all users can safely and easily move around their vehicle to access both the chargepoint and the charging port. Consideration of these criteria can also support improved accessibility for surrounding areas, such as reducing the risk of obstructions to other highway users including pedestrians and cyclists.

In recognition of emerging evidence that some users can feel unsafe while charging, particularly at night, PAS 1899 includes general principles on how to ensure an inclusive and safe charging environment. This includes guidance on the inclusion of lighting around public chargepoints, both in the vicinity of the chargepoint itself and on routes to nearby amenities. To further support consumer confidence and safety, PAS 1899 includes guidance on the provision of security cameras around public chargepoints and consideration for installing chargepoints where security cameras already exist.

PAS 1899 has also been developed to include general provisions to improve the overall charging experience for consumers. Features such as overhead covers in off-street charging locations can provide protection from adverse weather, and create a more inclusive and comfortable environment for people to charge their vehicles. In addition, providing signage to identify where public chargepoints are located can also be a helpful feature both from an inclusivity perspective, and a general consumer experience improvement. The UK Government anticipates that, once there has been a reasonable adoption of PAS 1899 principles across UK chargepoint sites, these sites may become the preferred choice for consumers when deciding where to charge their vehicles.

### **3 Industry response**

Following publication of PAS 1899, uptake across industry has been slow. However, given that it can take several weeks or months [9] for sites to receive planning permission, as well as consideration for time taken to design, procure and construct chargepoint sites; it is not surprising that only a small number of chargepoint sites across the UK currently claim to be accessible.

The UK Government has been promoting PAS 1899 across industry, encouraging its uptake and signposting stakeholders to further support where required. Overall, the response has been positive, with key organisations across the EV and EV charging sector understanding the need for accessible charging across the country. However, there has been some resistance from stakeholders that are concerned that by adopting the specifications in PAS 1899, that it will significantly increase the costs of installing chargepoints, and may not be commercially viable. In contrast, other stakeholders have confirmed that including accessible features within chargepoint site design has reduced costs – through the installation of charging hubs in flat surfaced car parks, without kerbs and minimising the number of bollards, for example.

More recently, announcements have been made across industry of sites where accessible charging has been provided. This includes InstaVolt's expansion of the Stroud Park charging hub [10], which claims to include twelve wider access and four fully accessible bays in line with specifications in PAS 1899. It should be noted that compliance with PAS 1899 specifications has not yet been verified, but improving accessibility of public charging infrastructure and promoting this in the media is a positive step, irrespective of total compliance.

British charity Designability have developed prototypes for charging units, to demonstrate how accessibility can be applied to both fast and rapid charging units [11]. Whilst these prototypes will not be developed further by Designability, they offer inspiration for the EV charging industry on how charging units can be designed with all users in mind. Designability continue to promote their prototypes and design guidance across industry.

Since PAS 1899 has been published, industry have collaborated to further increase the inclusivity of the UK public charging network. Shell Recharge recently partnered with Motability in a thirteen week pilot scheme [12], which allowed eligible Motability customers to access the Shell Recharge network. Feedback was sought from the participants, to better understand barriers that drivers with disabilities experience when using public chargepoints.

### **4 Next Steps**

The expectation is that the availability of PAS 1899 will improve the provision of accessible, inclusive designed public charging infrastructure across the UK. As with all BSI standards, compliance with PAS 1899 requirements is voluntary on implementation. While the requirements will not be enforced at this stage, the UK Government is pursuing a series of actions to encourage voluntary adoption of the standard by relevant parties. This includes engaging local governments, who play a key role as procurers of charging infrastructure

for deployment in their local areas, to encourage the incorporation of accessibility considerations into procurement models and central government funding bids.

Ahead of new regulations intended to be laid in 2023, the UK Government is working with industry to utilise open data to support users locate the right chargepoint for their needs. The UK Government is aware of several organisations which are exploring options to offer PAS 1899 accreditation schemes, which may support consumer confidence if they are chargepoint site in the knowledge that a third-party has verified that it will meet their individual needs. This could increase competition amongst chargepoint sites and providers, and encourage greater rollout of accessible public chargepoints, should consumers show a preference towards PAS 1899 compliant sites.

The UK Government will continue to monitor the market for progress in the area of accessible charging, focusing on: uptake of the standard by chargepoint providers; the emergence of third-party accreditation schemes; and feedback from industry and disabled users. This will inform whether a more interventionist approach (including through regulation) is necessary to futureproof the UK's public charging network so it can be accessed by all.

PAS 1899 contains the best available evidence on making EV charging accessible. However, it can be expected that this guidance will need to evolve as more consumers switch to EVs and more evidence on charging patterns and user needs becomes available. PAS 1899 is an iterative document that will be reviewed 24 months post-publication in consultation with relevant stakeholders, whereupon a decision will be made on whether to upgrade the guidance to a full British or International (ISO) Standard. The UK Government and Motability are currently reviewing options to set up a technical working group which can provide feedback to shape the next iteration of PAS 1899, and explore whether a formal standard would be suitable.

The UK Government will continue to monitor the market for progress in the area of accessible charging, and whether industry are adopting PAS 1899 as public charging infrastructure rollout increases. The UK Government is clear that if insufficient progress is made, it will consider more interventionist approaches (including through regulation), to ensure that all consumers are able to easily find chargepoints to meet their needs.

## Acknowledgments

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## Presenter Biography



Chloe is Deputy Head of Stakeholder Engagement and International in the Office for Zero Emission Vehicles (OZEV), supporting the team's liaison with industry stakeholders and international Governments. She also leads on accessibility policy in OZEV, supporting an inclusive charging infrastructure rollout across the UK. Chloe joined OZEV in August 2021, initially supporting policy for the UK's Plug-in Car Grant until the scheme was closed in June 2022. Prior to joining OZEV, Chloe worked for a local authority highway department, leading the team responsible for statutory consultations and legal agreements.