POLICY BRIEFING
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CHARGING WHEN PARKING – A SOCIAL CHANGE OF ROUTINE

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CHARGING WHEN PARKING – A SOCIAL CHANGE OF ROUTINE

SUMMARY:

• Parking routines change to accommodate charging of electric vehicles (EV), even for those who can park and charge on their own driveway.

• EV charging in shared or public spaces, whether in a residential neighbourhood or at work, makes parking practices more complex and more social.

• Parking and EV charging hubs in local car parks are attractive to nearby residents in market towns and villages.

1 INTRODUCTION

Previous research has shown how, when, and where electric vehicle (EV) drivers usually charge their cars or vans is shaped more by their daily parking routines than by their refuelling patterns[1]. Combining charging with parking has multiple advantages from the driver's perspective:

- the extra time charging takes compared to refuelling with petrol / diesel can be filled with other activities;
- separate journeys to refuel are eliminated; and
- slower charging (up to 22kWh) is usually less expensive per kWh compared to rapid and ultra-rapid.

However, when developing routine behaviours that integrate charging with parking, EV drivers must alter their previous parking routines. The level of alteration required depends upon a variety of factors or elements:

- Materials: the space and equipment the new EV driver has at their disposal for both parking and charging;
- Skills: as required to both charge and park, choose the most appropriate charging speed for the car, and get the best price for the electricity; and
- Meanings: how EV drivers perceive and value aspects of parking and charging, such as convenience, security, and relationships with neighbours.

Some changes to parking routines may only occur when charging is required, not every time the vehicle is parked. By investigating these changes, we can better understand the use cases for public parking and charging services.

In order to understand the elements of parking and charging and how the latter results in changes to the former, we conducted 42 interviews with individuals or couples who live in Oxfordshire and either already drive an EV (16 interviewees) or expressed an interest in EV and EV charging. Our interviewees included 20 women and 28 men, living in a mix of household sizes: single adults, as couples, 3-4 adults, with and without children. Only 3 of our interviewees were under 30, 13 were 30-50, and 33 over 50, but all are car drivers with one or more vehicles in their household bought new, leased new, second-hand and / or as a company car.

1 Philipsen, R., Brell, T., Brost, W., Eickels, T. and Ziefle, M., 2018. Running on empty–Users' charging behavior of electric vehicles versus traditional refueling. Transportation Research Part F: Traffic Psychology and Behaviour, 59, pp.475-492.

The majority of interviews were recorded at events held in Oxfordshire to promote the switch to EV and advertise the installation of new charging hubs in public car parks. These events were organised as part of the Park and Charge Oxfordshire project (**Box 1**).

Box 1: Park and Charge Oxfordshire

Park and Charge Oxfordshire is an initiative funded by The Office for Zero Emission Vehicles and Innovate UK, and delivered by EZ Charge (part of Zeta Group), Urban Integrated [ui!]uk, Oxfordshire County Council and the University of Oxford. EV charging hubs are being installed in car parks across the county, hosted by Cherwell District Council, West Oxfordshire District Council, South Oxfordshire District Council and the Vale of the White Horse District Council with the aim of giving nearby residents with no off-street parking the ability to park for free overnight and charge their EV at competitive prices.

2 MATERIALS, SKILLS, AND MEANINGS OF PARKING AND CHARGING – EVEN AT HOME

It is useful to break down a routine behaviour like parking into the three elements described in the previous section - materials, skills, and meanings – to better understand what additional elements might be needed to incorporate simultaneous charging (Table 1).

Table 1: Elements of parking and charging routine behaviours

Practice Element	Parking	Charging
Materials	• Spaces: location, size, orientation • Vehicles: number, size, shape • Adjacent uses	• Electricity source: location, voltage • Electricity connection: cables, chargers • Additional controls, apps
Skills	• Finding parking space • Manoeuvring into parking space	• Ability to connect vehicle • Programming and payment
Meanings	• Convenience to home / destination • Competitive, cooperative, or private	• Safety and security (vehicle, walking) • Cost and time savings

The additional materials, skills and meanings required for charging have changed the parking routines of interviewees who drive an EV, even if they charge their vehicle on their driveway. For example, some EV drivers only charge at certain times of day because of security concerns about their electricity source and connection or because they want to get the cheapest electricity possible.

As one EV driver said, *"I usually plug it in and set it for charging up overnight, on economy seven. But I just recently got a zappy charger, so this at the moment is pulling 2.2kW off my solar panels on the roof."* [2]

2 Male over 50

Meanwhile, an EV driver who did not have an outdoor home charger installed said, "*I will tend to plug it in when I get up in the morning, because also we have to have the garage door open. So I don't want to leave the garage door open overnight…"* [3]

This quote also shows how the elements of charging and parking routines offer insights into the social dynamics that shape these routines, or social practices[4] . EV drivers are aware that charging whilst parking may be more visible than their previous parking routines to other people passing their home, even if they are parking and charging on their private driveway.

3 BEYOND THE HOME – PARKING AND CHARGING AT WORK OR ON STREET

For EV drivers who cannot or prefer not to charge on a private driveway, the switch to an EV results in more dramatic changes to their parking practices whenever they want to charge. The combined parking and charging routines are more complex with more social interaction.

As discussed in the previous section, parking and charging is more visible. An EV driver who parks on-street outside his home explained, *"I run a cable across the footpath and cover it with a high-vis mat. And I… only charge it during the day… so there's no question of anybody saying they didn't see. Everybody's been very positive. …in the street …several other people are watching very carefully as to how successful ours is."* [5]
He and other EV drivers interviewed reported being solicited for their experiences by neighbours and colleagues interested in making the switch.

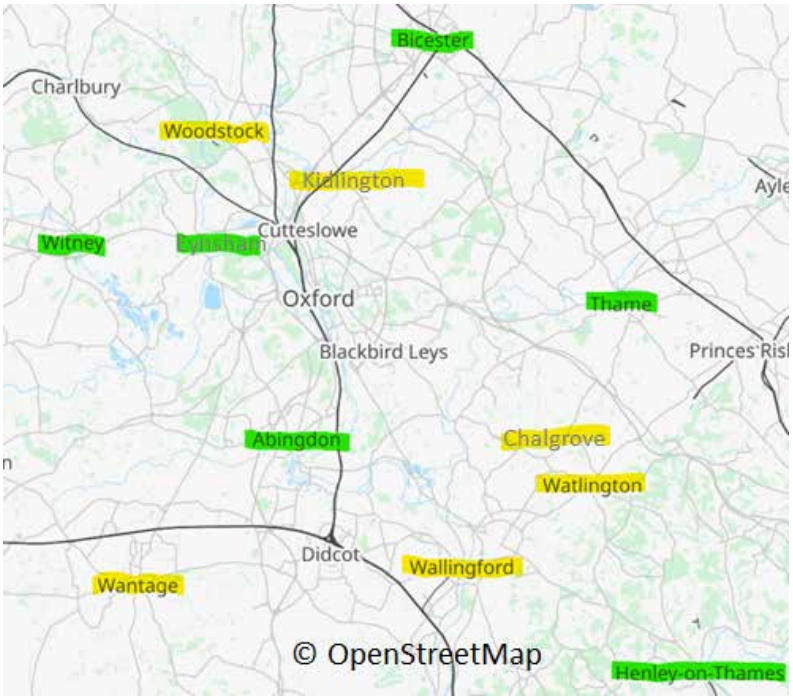
There are also social interactions between EV drivers when sharing charging infrastructure. For some, there is a sense of community, as one interviewee described, *"I only charge the [EV] at work and that's informed by simply the cost of charging. It's free at work. …we've created a little Teams group for the group of chargers we have at work, where we can send messages and say I desperately need a charge."* [6]

However, others' experience is more one of competition: *"…it's a public car park so I park next to the charging point. And you're allowed three hours on there, and … if you're over three hours, they know. They know where you are, they come and tell you."* [7]

The EV drivers we interviewed are aware that having to make substantial changes to parking practices might dissuade friends and neighbours from making the switch. Likewise, many who do not yet drive an EV recognise that the changes required to combine parking and charging practices will make having an EV difficult for them or their neighbours.

Our interviewees came from towns and villages around Oxfordshire, in places with populations ranging from under 3,000 to over 30,000, as highlighted on the map (**Map 1,** next page). The places highlighted in green hosted events for the Park and Charge Oxfordshire project, whilst those in yellow were also mentioned by interviewees.

3 Female over 50
4 Kurnicki, K., 2020. How to park a car? Immobility and the temporal organization of parking practices, Mobilities, 15:5, 708-724.
5 Male, over 50.
6 Male, over 50
7 Female, over 50



Map 1.

Interviewees from Watlington to Woodstock told us about a lack of off-street, private parking at home for themselves or their neighbours. Even where private parking is available, it is not necessarily adjacent to the property or provided with an electricity connection.

As one interviewee in Bicester said, *"I've just bought a new build... and like a lot of them, my actual parking space was not next to the house. It was in a ...almost parking lot style situation at the back... To get the cable out... would just be quite expensive to lift the floor and... get permission from everyone."* [8]

This means that even if parking pressure in the residential streets of these towns and villages is limited, in particular when compared with larger cities such as Oxford or London, the demand for EV charging will increase competition for public or shared parking space in these communities.

4 THE APPEAL OF A PARK AND CHARGE SERVICE IN LOCAL CAR PARKS

Park and Charge Oxfordshire is installing charging hubs in local, public car parks in towns around the county (see Box 1), so that residents who currently park on-street or in private, shared parking areas, can park and charge at a public car park at speeds of up to 22kW. The service also plans to offer a membership scheme that enables local residents to book a space and access cheaper electricity overnight than would be available during the day. With an average of 12 spaces available at each hub, users can be confident that they will have a space to charge.

Current EV drivers have said they recognise the potential of these hubs as a local option for:

- Materials: greater charging speeds than at home: *"Charging is taking too long because we've just got a three-pin plug. [If there were more public charging], I'd probably use [the car] a lot more. Look to get probably another electric car..."* [9];

8 Male, under 30
9 Male, 30-50

- Skills: to find EV charging when visiting friends and family: *"it will be nice to know there was a charging point in Witney so we could just drive up to the car park, plug the car in and then go off and meet our friends."* [10] and
- Meanings: convenience to home as well as regular shopping destinations: *"Finding places to charge is quite complicated, especially if I'm arriving somewhere with children, I don't, I don't want to be going and finding a very specific corner of somewhere..."* [11];

Furthermore, those who usually charge at work see benefits in terms of flexibility to work from home and charge nearby instead of having to go into work to charge, or to charge on the weekends or other non-work days. The certainty of a pre-booked space is also attractive.

This means that even if parking pressure in the residential streets of these towns and villages is limited, in particular when compared with larger cities such as Oxford or London, the demand for EV charging will increase competition for public or shared parking space in these communities.

Those who don't yet drive an EV also see advantages, especially if the service greatly increases the charging opportunities nearby, with more availability, affordability and convenience. Such a service would remove the uncertainty some expressed of whether they would be able to charge near their home, as one interviewee said, *"We have a parking space but it's not near the house, so it's...around the corner... so that is a worry when it comes to the electric, because I don't have a way to charge it."* [12]

Finally, for the interviewees who know that charging an EV from their domestic electricity simply isn't possible, they look forward to the opening of this service to enable them to switch. And they can provide a social example for their neighbours to also change their practice of parking to parking and charging an EV.

10 Female, 30-50.
11 Male, over 50
12 Male, 30-50

Implications	
For Policy Makers	**For Charging Providers and Operators**
EV owners require additional materials and skills to charge as well as park, and information about how and where they can charge could encourage more people to switch to an EV.	A charging hub can provide EV drivers with elements of parking and charging that might not be available at home, which would make the service more attractive. Materially, this may be an electricity connection that allows faster charging, or additional charge points for flexibility.
Parking and charging an EV also involves social interactions with neighbours and other EV owners. These can be supported through policies such as nominating local EV champions and organising local EV forums.	In terms of skills, the hub's software could help the user get the optimal price without having to learn to use new technologies. An accessible helpline should also be provided.
Public EV charging options are needed in towns and villages as well as cities, to give local residents the confidence to buy an EV even if they don't have a driveway.	A locally-focused service and membership could support positive social interactions between EV drivers through a user group to exchange information.

About the Project

This note was produced as part of the **Park and Charge Oxfordshire Project**, an **Innovate UK** funded Real World Demonstrator for electric vehicle charging for public spaces (Project Number 105428) involving **Zeta Group**, **Urban Integrated Limited ([ui!]uk), Oxfordshire County Council** and the **University of Oxford.** The commercial partners have created **EZ-Charge** to operate the charging hubs.

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About the Transport Studies Unit

The **Transport Studies Unit (TSU)** has been the centre of transport research excellence within the University of Oxford since 1973. The TSU hopes to inspire and inform change towards a more sustainable, just and accessible transport system by advancing understandings of the systems, processes and practices that shape the way people and goods move. Based within the world-leading School of Geography and the Environment at the University of Oxford, the TSU approaches global transport challenges from social science and holistic perspectives. Its work is organized in four broad themes: energy, climate and environment; politics, power and governance; everyday life and justice; and health and wellbeing.

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