Can the market alone deliver EV chargepoints?



September 2021

frontier

Facilitating Electric Vehicles



Agenda

1. Introduction to Charge Collective

- 2. Markets failures and barriers
- 3. Identifying cold spots





Facilitating Electric Vehicles

UK Power Networks

The NIA Charge Collective project

Charge Collective aims to develop a framework to overcome barriers to investment in EV public charging infrastructure



Deliverables:

- Improved understanding of the process and tools needed by DNOs to address market failures and enable investment in charge points
- Facilitate the installation of charge points



Project work packages



Work Package 3: Research opportunities for flexibility services

Investigate the potential for the chargepoints to deliver flexibility services to the grid and maximise benefits



Facilitating Electric Vehicles

Agenda

- 1. Introduction to Charge Collective
- 2. Markets failures and barriers
- 3. Identifying cold spots





Facilitating Electric Vehicles

UK Power Networks

Rationale for intervention:

- The market will not deliver the best possible outcomes
- Market failures may be temporary and therefore, rationale for intervention might be time limited
- Three sets of failures may apply:
 - Market failures e.g. externalities
 - Policy failure e.g. uncertainty
 - Regulatory failure e.g. regulator's choices that lead to price signal distortions



Delivering your electricity

Rationale for intervention





Driving Change

UK Power Networks

Relevance to segments

 \bigcirc Logic does Only part of Logic applies the logic applies

not apply





Overcoming barriers

In Theory

- Ideally, interventions would tackle market & other failures directly:
 - price for clear air to tackle high air pollution externality;
 - design of appropriate price signals to internalise coordination benefits;
 - ontractual system to tackle policy uncertainty

In Practice

- **Reduce up front capital hurdle** in order to increase chargepoint investment by
 - reducing the impact of market failures; and
- helping to directly resolve regulatory failures (if upfront discount is offered via regulatory charges)
- Develop a network coordination plan



Facilitating Electric Vehicles

UK Power Networks

Agenda

- 1. Introduction to Charge Collective
- 2. Markets failures and barriers
- 3. Identifying cold spots



Facilitating Electric Vehicles



UK Power Networks

Cold spots

- Intervention should target "cold spots" where investments that would have a high social return are not occurring
- The intervention should choose locations where these market failures are driving a wedge between the social benefits of the investment.

Encourage EV take up

Deliver benefits to wider society

Target areas where it stimulate an increased take up of EVs. This in turn would:

- improve the prospects of investors
- reduce the risk around sunk costs recovery
- reduce the impact of uncertainty around policy and regulatory choices

Target areas where it can:

- reduce pollution externalities
- Benefit vulnerable customers
- help ensure a fair distribution of benefits among UKPN customers

Impact investment

Target points where investment would not happen otherwise:

- address the coordination failure
- reduce the first mover disadvantage
- reduce the risk around sunk cost recovery and impact of potential capital market failures
- reduce the impact of uncertainty around policy and regulatory choices



Locations

• Potential locations were identified through a filtering method





Facilitating Electric Vehicles

12

UK Power Networks

Filtering locations (1) Impact on EV uptake

The chosen locations should enable greater take up of EVs

Area-specific factors: where could chargers enable greater take up?

- Areas that offer few options for charging
- Areas with high population density

Customer-specific factors: who are the potential EV buyers?

- EV buyers can therefore be expected to:
 - Have high average income,
 - Live in urban (or densely populated) areas,
 - Already own a car (EV as a replacement or a second car),
 - Have no access to off-street parking



Coloured shapes indicate parking scheme areas

Facilitating Electric Vehicles



Driving Change

UK Power Networks (1) Ultra Low Emission Vehicles (ULEV) are presently defined as emitting less than 75 gCO2/km from the tail pipe (2) Uptake of Ultra Low Emission Vehicles in the UK (2015) (3) London Councils allow their residents to suggest that an on-street EV chargepoint is delivered near their home

Filtering locations (2) Wider societal benefits

The chosen locations should bring wider societal benefits

Externalities: where could increased take up generate benefits from reducing externalities?

- High air pollution areas,
- High noise pollution areas
- Increased take up should lead to a reduction in pollution in the local area as a whole.

Vulnerable customers and fairness: how to ensure that benefits from chargepoints are shared across all customers?

- Low-income customers that may be likely to switch to EVs (e.g. in areas with high car ownership)
- Low-income/vulnerable customers that do not own a car or are less likely to switch to EVs through reducing pollution externalities





Percentage of licensed cars that emit over 191 gCO2e/km_{0.06} 0.08 0.10 0.12 0.14

Outdoors living environment decile of LSOAs in England 2.5 5.0 7.5





Health deprivation and disability decile of LSOAs in England 2.5 5.0 7.5 10.0

Index of Multiple Deprivation decile of LSOAs in England 2 4 6 8 10

Facilitating Electric Vehicles



Thank you





UK Power Facilitating Electric Vehicles Networks **Delivering** your electricity

Driving Change

UK Power Networks