Can the market alone deliver EV chargepoints?

September 2021
Agenda

1. Introduction to Charge Collective
2. Markets failures and barriers
3. Identifying cold spots
The NIA Charge Collective project

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

**Project aim**
- Address market failures by tackling capital hurdle
- Increased public chargepoint investment
- Increased consumer take-up of EVs
- **Net Zero** as well as broader social / environmental benefits

** 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 1: Optimising chargepoint locations**
- Choose the best locations for new public chargepoints
- Work with three Local Authorities to find socially optimal chargepoint locations
- Development of a coordinated investment plan that balances local benefits and network costs

**Work Package 2: Trialling an intervention to promote investment**
- Competitively tender for investment to deliver these public chargepoints
- Development of a methodology for structuring the discount on regulatory charges to fund chargepoint investment
- Design and hold a tender in which investors bid discounted regulatory charges at selected chargepoint locations
- Create learnings that allow this approach to be rolled out across GB

**Work Package 3: Research opportunities for flexibility services**
- Investigate the potential for the chargepoints to deliver flexibility services to the grid and maximise benefits
- Development of a methodology for structuring the discount on regulatory charges to fund chargepoint investment
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**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

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**No rationale for intervention**

- Investments privately undertaken will equal investments from a socially optimal point of view

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**Rationale for intervention**

- Required Private Return
- Social Return
- Gap implies under-provision

- Impact of failures may be greater for investments with higher upfront capital costs
### Rationale for intervention

#### Market failures

- **Network externalities**  
  - Market will not deliver ahead of need
- **Coordination failure**  
  - Coordinated approach to EV charging infrastructure may lead to lower costs to investors and consumers and result in more EV chargepoint investment
- **Externalities** (air pollution areas)  
  - Imperfect price on clean air - EV users in polluted areas cannot privatise benefits they create

#### Policy uncertainty

- Investors face significant **policy uncertainty** which is induced by the government (central and local)
- The risk may **impede or reduce** investment in chargepoint infrastructure

#### Regulatory choices

- **High upfront connection costs** to investors of EV chargepoints can:  
  - magnify impact on investment from market failures and policy uncertainty
  - can result in an additional market failure, if there are capital market failures
- Cost recovery elements of charges (i.e. recovery of sunk costs) might lead to **distortions to the forward-looking signals** and therefore, not deliver efficient incentives to invest
Most market failures apply to publicly used chargepoints however, there are a number of market failures/barriers that apply to the other segments as well.

<table>
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<tr>
<th>Segment</th>
<th>Network externality</th>
<th>Coordination failures</th>
<th>Externality - air pollution</th>
<th>Policy uncertainty</th>
<th>Regulatory choices</th>
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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;
  - contractual 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**
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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**  
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

**Deliver benefits to wider society**  
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

Identifying areas where support could bring considerable benefits

1. In which locations is a chargepoint most likely to encourage greater take up of EVs?

2. In which of these locations is a chargepoint most likely to deliver substantial wider benefits?

3. In which of these locations is an intervention likely to have an incremental impact on investment?

To be delivered via the procurement approach
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

Ultra Low Emission Vehicles (ULEV) are presently defined as emitting less than 75 gCO2/km from the tail pipe

Uptake of Ultra Low Emission Vehicles in the UK (2015)

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
Thank you