Consumers, Vehicles and Energy Integration (CVEI) project

LCV – Electric Vehicles and Energy Systems: Smart Charging Projects and V2G session

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Vehicle electrification

- Energy supply
- Users
- Vehicles
- Emissions
- External factors
- Market structure
The project requires a broad range of expertise
A combined set of modelling tools have been developed to provide an **integrated, holistic** means of quantifying and qualitatively assessing the impacts on and from *infrastructure, consumers, vehicle uptake and use, policy measures* and *commercial models* across the system.
Scenarios have been developed to test further factors

OEMs make ULEVs attractive to consumers alongside more limited, but ongoing, Gov. support

Central Gov provides supportive, tech.neutral, environment for ULEVs and infrastructure

Central Gov promotes mass transition to hydrogen; supporting infrastructure and deployment

City regions drive transport agenda; focus on urban vehicle asset sharing and support for PiVs/related infrastructure

No explicit ULEV support after current measures expire

Organic action

Coordinated action

Mobility as an asset

Asset sharing

Incentivised Innovation

ULEV Enabled

H₂ Push

BaU

Incentivise ULEVs

Managed charging

Technology optionality

Disincentivise ICEs

MPF infrastructure focus

Incentivise ULEVs

Backing a winner

Dedicated vehicles

City Led

Dedicated vehicles

Smaller vehicles

Rapid charging

Vehicle sharing

Transport on Demand

• New ways of meeting customer demand
  • Locally led change

• New ways of meeting customer demand
  • Centrally led change

• Traditional ways of meeting customer demand
  • Industry led change

• Traditional ways of meeting customer demand
  • Customer led change

DM aggregator

Static ToU

Vehicle sharing

Incentivise ULEVs

Smaller vehicles

Managed charging

Rapid charging

Vehicle sharing

Incentivise ULEVs

Smaller vehicles

Traditional ways of meeting customer demand

Static ToU

Dedicated vehicles

Incentivise ULEVs

Disincentivise ICEs

Managed charging

Technology optionality
Interim findings

Reducing the upfront cost of ULEVs is a crucial driver of uptake in the near to medium term

ULEV uptake can lead to a sizeable drop in net transport-related Government revenues

A moderate uptake of ULEVs can be expected even with limited Government intervention but this does not result in the lowest Government revenue gap

The economic benefits of car sharing appear material

Charging behaviour is primarily driven by EV owner preferences, convenience and habit, rather than cost

Amongst adopters to date:
- Changes to “main” and “second” car dynamic
- EVs being driven comparable mileages to ICEs

Rapid charging development is a priority to enable sufficient deployment for the medium term

Infrastructure entities likely to be loss-making in the near to medium term but would appear profitable in the long term

Awareness of public charge points may be more important than actual availability

Successful demand management reduces balancing and network costs – must be tested with mainstream consumers

Image from www.goultralow.com
Roadmap for efficient ULEV uptake and use

Government policy and market intervention

- EU emission regs
- Tightening emissions regs
- Limited coordination and support for rapid charging
- DM shared services framework
- Coordinated DM procurement
- Central DM market platform
- Facilitation of urban car sharing
- Support for larger scale car sharing
- H₂ appraisal
- H₂ infrastructure de-risking
- Road pricing
- Competition monitoring

Actions by commercial entities

- User-Managed Charging use
- Supplier-Managed Charging use
- Rapid charging infrastructure investment
- Initial car sharing implementation
- Mass market car sharing implementation
- Hydrogen infrastructure investment

2015
2020
2030
2040
2050

Upfront cost mitigation for ULEVs
Carbon price pass through for liquid fuels
Social transition support
Essential
Desirable
Provisional
Trials will deliver further robust evidence

**Charging Behaviour Trial**

- Assess response to different tariff propositions – user-managed (ToU tariff) versus supplier-managed charging
- 240 consumers, 2 months with a vehicle, (parallel) BEV and PHEV trials
- Data on use and charging with additional questionnaires and choice experiments

**Vehicle Uptake Trial**

- To enhance understanding of adoption of EVs
- 200 consumers, given 4 days with each of 3 vehicles in turn (BEV, PHEV, ICE)
- Additional questionnaires and choice experiments (with reduced ‘psychological distance’)
Summary

• The **Consumers, Vehicles and Energy Integration** project is seeking to address the challenges involved in transitioning to a secure and sustainable low carbon vehicle fleet

• An **integrated modelling toolset** has been developed able to examine the implications for energy supply, infrastructure, vehicles, users, policy and commercial models – and with it, it is possible to test a wide range of scenarios

• Findings from several areas are already available and have been incorporated into a **roadmap** for delivering efficient vehicle decarbonisation

• Upcoming trials will deliver further robust **evidence** on how consumers respond to different charging propositions and attitudes to ULEV adoption