

Energy UK written evidence: Role of Vehicle-to-X Energy Technologies in a Net Zero Energy System

Introduction

Energy UK is the trade association for the energy industry with over 100 members spanning every aspect of the energy sector – from established FTSE 100 companies right through to new, growing suppliers and generators, which now make up over half of our membership.

We represent the diverse nature of the UK's energy industry with our members delivering over 80% of both the UK's power generation and energy supply for the 28 million UK homes as well as businesses.

Energy UK members are highly active in the electric vehicle (EV) space, offering EV tariffs, smart charging and vehicle to grid, leasing and selling EVs either directly or in partnership with other companies, and installing and operating chargepoints in homes, businesses and in the public domain.

Our members are among those leading the technology developments that facilitate the changes in consumer behaviour required to achieve the UK's net zero ambitions. Indeed, some of our members have been instrumental in the V2X trials that have delivered both technical proof of concept and furthered understanding of consumer experience.

In this response we have provided some general thoughts under the two broad headings of *Implementation* and *Challenges*. Our members may address each question individually where their specific experience and viewpoints allow them to respond in more detail than our general summary.

General Feedback

- Energy UK's members support V2X in concept and in practice. V2X is a credible form of flexibility and will be one of the many flexibility tools available to the system. Today, trialling continues to be an important step towards technical delivery of the emerging potential.
- Customer choice must be a central principle behind the uptake of V2X offerings, and participation encouraged via market price signals and revenue earning opportunities.
- Incentivising EV adoption more generally must remain the absolute policy priority for the time being. Widespread EV adoption is the precursor to V2X's broad potential. Any intervention supporting developments in V2X must not impede EV adoption and must be designed to complement this global policy objective.
- Our members fully expect strong business cases for V2X to emerge in their own right as access to electricity markets and revenue opportunities improve for providing flexibility. Consumer-facing business models will not appear overnight, but large-scale proof of concept offers are already commercial/fleet applications.
- The information and technology barriers identified are likely to fall away given time, as uptake accelerates and cost per installation reduces. Energy UK continues to monitor these challenges alongside the ADE and Citizens Advice. We see little need for intervention now on most of these barriers given that the scale of uptake of EVs required is yet to emerge.

- The issue of extremely limited native V2G capability among EV makes and models should be explored further now to ensure it doesn't become an enduring barrier to adoption at scale or drive higher than necessary cost into the scaled solution(s).
- A stronger case can be made for near-term consideration of the system barriers. Working now towards increasing certainty and removing inappropriate restrictions inherent to current market rules should ultimately accelerate the availability of V2X technologies at scale. This includes further urgent consideration of the G98/G99 connections application process. Where appropriate, standards should be considered as part of the ongoing policy discussions about smart charging infrastructure.

Implementation

Thoughts on the feasibility, timing and role of V2X energy technologies in a future energy system.

V2X technologies will be one of the many tools available in a future energy system. Its role is potentially significant, although it's too early to say exactly when and how it might achieve widespread adoption.

Each V2X implementation depends on several things, in a hierarchy:

1. a Zero Emissions Vehicle (ZEV);
2. the supporting technology and infrastructure to provide V2X functionality; and
3. an EV user willing to make use of that functionality.

In addition, for this to happen effectively and at scale:

4. sufficient take up to deliver benefits to the electricity system;
5. attractive cost/pricing model; and
6. simplicity of adoption and use, probably including some degree of standardisation.

We are confident that ZEVs will continue to grow in popularity and rapidly become the default choice for new purchases, not least because their upfront cost will match that of petrol and diesel cars this decade. This widespread adoption of EVs is the foundation of all other benefits, including those of V2X. Incentivising the take up of ZEVs must therefore remain the primary policy goal, and we should remain cautious about the potential for peripheral functionality to add complexity into the EV offer before it is well proven and widely available. Overcoming the barriers to EV adoption is today's challenge, and V2X functions will develop through innovation beyond the core frameworks set for smart charging.

We believe that the benefits of V2X are sufficiently clear today to be able to assume that it will be taken up in accordance with a standard technology adoption curve. There are different views about the relative savings value from V2X compared to those from smart charging. In any event, implementation at scale remains years away until there is a high enough penetration of EVs in the overall UK vehicle fleet, with even early EV drivers unwilling to invest at current cost.

Energy UK believes that by and large the private sector is best placed to fund, deliver and operate EV charging in the UK. That will include development of further functionality such as V2X. The trials undertaken by our members have demonstrated the potential for material financial benefit (where infrastructure costs are not considered). Energy UK members disagree on the role of a specific subsidy in supporting V2X technologies at this stage. Public funding is best targeted where there is an unmet public need, for example the support grid connections for high powered chargers at motorway service areas, the continuation of the off-street charging schemes and targeted funding for on-street charging and rapid charging hubs.

The charging infrastructure sector is already growing rapidly with a high level of competition, with a considerable amount of work underway at EV charging infrastructure policy. Energy UK is confident in the growth of the sector, especially given the many encouraging policies in place to support deployment announced in the last Spending Review.

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With the right market price signals, the ZEV and charging infrastructure markets will respond and provide for future V2X requirements. This principle of 'future proofing' is the right one, whereby the balance is struck between being overly prescriptive (thus stifling innovation), and allowing a proliferation of standards and systems. It can be argued that EV drivers are currently having to manage overly complex variety in charging infrastructure and systems, for example. Early adopters will accept a degree of complexity: to reach the late adopters, this complexity needs to be resolved.

For V2X technologies, this could mean:

- The market favouring certain V2X business models initially.
 - A Vehicle-to-Home implementation based on daytime workplace charging gets consumers used to the idea of EV as an energy source, and can be implemented before the development of the flexibility capability needed to commercialise V2G.
 - Commercial fleet implementations are underway already and more should be encouraged. These are the perfect use case for commercial proof of concept, with easily controllable and consistent vehicles and infrastructure.
- Understanding now whether AC/DC conversion capability will be widely and consistently implemented in the next generation of ZEVs, before considering V2X standards in charging infrastructure.

The vehicle development cycle inevitably means that vehicle manufacturers are not able to respond to changes in policy and consumer demand immediately but the timescales at play for V2X are long enough to account for this. However, given the very limited V2X capability in UK EV models today, it would be prudent to understand fully the reasons for this.

For many manufacturers, there remains an absence of clear consumer value for providing flexibility services. Without accessible market value for consumers providing flexibility, there is no case for developing these technological offerings. Current market reforms and service designs continues to treat participation from small scale assets like EVs, heat pumps and home batteries as a fringe opportunity. To overcome this, wider reforms are required. As such we note that we are glad to see the clear connections made between EV charging and the Smart Systems and Flexibility Plan.

Our members may give you a more in-depth view on the technical and commercial merits of incentivizing V2X functionality development in vehicles or charging infrastructure, or both.

Challenges

Thoughts on the barriers to implementing V2X technologies, and how to overcome them.

The barriers to implementation and adoption of V2X technologies have been set out comprehensively.

We agree that technical barriers are currently as follows:

- A limited choice of capable vehicle models
- High cost of AC-DC converters
- Complexity between V2X charging protocols
- Concerns about battery degradation

Of these, the first is an immediate concern, and we recommend further investigation and discussion with EV manufacturers to determine intentions and challenges. In particular, we would note the difficulties that market participants find in recruiting participants for trials. Such trials are hugely important, and to demonstrate commercial and technical benefits at scale will require a ready pool of various potential technology combinations that simply doesn't exist today.

Concerns about battery degradation relate more to uncertainty about the level of degradation relative to the benefits of participation in V2X. We expect participation in V2X services to be voluntary indefinitely.

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This barrier will therefore be lifted with further trialling and publication of studies – and there is plenty of time to do this.

The remaining technical barriers will be addressed as the business case for wide scale implementation of V2X progresses. Cost and complexity are eliminated over time *unless* the case for V2X does not hold water. Given we believe there is strong case for V2X, these barriers will be addressed as solutions are presented to the market. Our recommendation is that Government actively participate in industry discussions on requirements and standards and provide ongoing support in removing uncertainty early in areas such as security requirements.

We agree that consumers will be concerned about:

- Impact on vehicle warranties
- Being able to use their vehicle when they need it, either because they will be penalised, or because it won't be sufficiently charged
- User friendliness of V2X systems

These are informational barriers that need to and will be overcome in time. For example, a greater understanding of battery degradation is likely to allow manufacturers to be explicit about the impact of V2X on warranties. Proliferation of fast charging infrastructure may go a long way to allay concerns about lack of charge when needed – as the results of trials have already suggested. It is too early to address these concerns today, including barriers relating to low consumer awareness of V2G. We expect there to be robust answers to each issue before adoption of V2X at scale.

System barriers identified are as follows:

- Ensuring the ability of V2X to compete within existing markets
- Poor business case for domestic aggregators
- Export limits
- Low number of currently workable use cases

This last category of system barriers warrants consideration, not least because it identifies characteristics of the market that have the potential to stop V2G in its tracks. It is possible that given time and implementation at scale, the issues around limited viable use cases and low aggregator margins may be adequately addressed.

Therefore we are most concerned that mechanisms inherent to current market arrangements might prevent widespread adoption of V2G technologies. As such, our recommendation would be for early engagement with appropriate industry parties – DNOs in particular – with a request to confirm the likely impact of existing rules, and whether a change to those rules or requirements might be appropriate to avoid unintended consequences for V2X take up.

We would highlight one key example of current practice that is missing from BEIS's list, but that we recommend is tackled today in collaboration with industry and BEIS. The current processes for connection of multiple V2X instances (e.g. commercial fleet applications) pose significant issues in terms of practicality, uncertain cost structures and long waiting times. Our members will provide further detail on this barrier.

Sincerely,

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