



## Gemserv Response

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### The Role of Vehicle-to-X Energy Technologies In A Net Zero Energy System – 12/10/2021

#### Q1. WHAT ROLE DO YOU THINK V2X ENERGY TECHNOLOGIES WILL PLAY IN A FUTURE ENERGY SYSTEM?

V2X will play a crucial role in unlocking TWh of unused storage for the energy system. This storage will be geographically distributed throughout the country enabling both local grid and wider energy system support through the provision of bi-directional power flow. This will not only enable peak demand support for homes and buildings (V2H/V2B) but also grid support such as Fast Frequency Response (FFR).

V2X will help to mitigate the environmental impact of battery storage and the associated supply chain, as more of the battery's value will be used across its lifecycle. This will provide a greater value return to battery assets owners, in that currently 80% of a battery's value is unused by an EV owner in day-to-day driving. It will also support the uptake and high utilisation of renewable generation, as near real-time demand response can be provided when renewable generation behaves unpredictably. This mitigates infrastructure investments that would otherwise be required by network owners as V2X creates a more localised approach of distributed energy sources.

#### Q2. HOW DO YOU THINK V2X ENERGY TECHNOLOGIES WILL INTERACT WITH OTHER FLEXIBILITY TECHNOLOGIES IN A FUTURE ENERGY SYSTEM?

V2X can interact with flexibility technologies by providing near real-time accessibility of large-scale energy storage embedded in the transport system. This will allow a quick and aggregated response - by geographic location - through integration with the management system of charging infrastructure. Such examples of this includes providing fast response flexibility to the energy system through large scale distributed storage i.e., vehicle to grid (V2G) using a coordinated and centralised digital approach.

V2X will also form part of the Smart Home rollout, enabling vehicle to home (V2H) or vehicle to building (V2B) technology to support localised energy demands, taking pressure off the conventional grid at peak times. Additionally, this will support the influx of localised renewable sources, such as home installed solar panels, maximising the benefit of these sources to consumers.



### Q3. WHEN AND HOW DO YOU THINK V2X ENERGY TECHNOLOGIES WILL DEPLOY IN THE FUTURE?

V2X will sufficiently scale up in line with the end of fossil fuel vehicle sales in 2030. At this point there will be a large enough proportion of the UK vehicle fleet that is electric, to enable effective benefit from V2X technology.

In the lead up to this deadline, a significant cost reduction is required for bi-directional charging infrastructure. This will be subject to economies of scale for the increasing proportion of EVs and related infrastructure/technology.

V2X technology will primarily deploy in locations that exhibit extended periods of dwell time for electric vehicles, such as home, workplace, and depot-based charging. This requires that the vehicles must be habitually plugged in at all times when parked.

Additionally, as technology evolves, larger capacity batteries will play a greater hand in this transition, as they will not only have an extended lifecycle period, but there will be more residual unused value in these assets, to be unlocked with V2X.

### Q4. WHAT ARE THE POTENTIAL BUSINESS MODELS FOR V2X ENERGY TECHNOLOGIES IN THE FUTURE ENERGY SYSTEM?

Subscription model administration, potentially using centralised information would be of most benefit to both the energy system and the consumer/prosumer. This is due to V2X being a value-add service that is voluntary. It is essential to avoid the need for consumers to opt in or out for every V2X transaction. Once opted into a subscription service, the prosumer's interaction with the market is probably managed on their behalf within agreed and transparent parameters. The benefit may flow in the form of lower charging costs, reduced loan payments, subscription fees or reduced capital costs for the vehicle. If these service providers exist within a competitive market, then the consumer is likely to benefit from innovation and lower costs. This model will also aid energy forecasting for the grid.

An important consideration for V2X models (particularly Vehicle to grid (V2G) is the role of the 'service aggregator'. In the 'vehicle space' this could be provided by the vehicle manufacturer; the charge point operator or an independent aggregator. Any of the above may also choose to combine electric vehicles with a portfolio of other technologies, such as solar PV, domestic hot water heaters or in-home storage devices.

Whichever party or parties provides these services, a subscription service is likely to be appealing to customers.

We agree with BEIS/Ofgem's view that the market is nascent and that there is significant scope for growth. It is also important that there is appropriate market governance that supports BEIS/Ofgem's principles of interoperability, data privacy, grid stability and cyber security.



## Q5. HOW CAN GOVERNMENT AND INDUSTRY ENABLE AND INCENTIVISE CONSUMERS TO REALISE THE FULL VALUE OF V2X ENERGY TECHNOLOGIES?

Specific tariffs for bi-directional energy users are an incentive that can be rolled out and should be shaped in conjunction with energy suppliers. This will enable EV owners that have V2X capability to be compensated for sharing energy from their battery asset.

Additionally, vehicle purchases and leasing agreements could have V2X incentives included in the price. This would reduce the cost of V2X enabled EVs for potential prosumers, increasing the vehicle market share of V2X enabled EVs.

Tax rebates are another way in which consumers can be incentivised to enter the V2X market.

Clear data driven public evidence pieces that show the economic viability of V2X for both the EV owner, and the grid should be developed; in essence showing that V2X will reduce the total cost of ownership of an EV via a marketing campaign.

## Q6. DO YOU AGREE WITH THE BARRIERS IDENTIFIED AND ARE THERE ANY BARRIERS MISSING?

The current approach to V2X is a patchwork and disconnected. A coordinated approach across sectors – in particular the automotive and energy sectors – would help to overcome this barrier. For example, if AC/DC converters could be built into the cars to avoid the necessity for installing specific V2X infrastructure. It is also necessary for automotive manufacturers to move away from their plethora of proprietary systems that lock users to certain systems and mechanisms.

Low levels of vehicles being plugged-in is not currently a barrier as there are not enough V2X enabled EVs out there to make this an imminent issue. It is suggested that once consumers transition to EVs, a significant proportion will be happy to provide V2X services from their vehicles.

More clarity is required as to when the automotive sector will transition to wireless charging – which will also be appropriate for bi-directional charging – maximising connectivity of the vehicle to the grid. This will remove the necessity for habitual plugging in of EVs when they are not in use.

The V2X term is key as it may be more appropriate to use V2B (building) and V2H (home) to enable greater value release – the more localised the better, the great benefit here might not be to supply the grid.



## Q7. HOW WOULD YOU PRIORITISE THE NEED TO ADDRESS THE BARRIERS, INCLUDING ANY ADDITIONAL BARRIERS THAT ARE MISSING?

The barriers that should be prioritised for V2X technology are:

- Creating a coordinated approach between automotive manufacturers and energy companies is top of the list. This includes driving standardisation across the EV industry enabling a singular approach to the delivery of V2X, as EV drivers are currently tied into limited specific models and charging standards for V2X. Only CHAdeMO standardised cars can perform V2X, as CCS and AC charging methods currently cannot do bi-directional power flow.
- Additionally, the energy and automotive sectors agreeing the best approach for V2X power electronics and delivery is crucial. Ultimately deciding where the power electronics should be situated, either in the charging station or the vehicle. This includes should the power flow be AC or DC bi-directional.
- Energy tariffs must be developed on a wider scale that can enable a more granular cost of energy to the customer, whilst including a price for return of energy to the grid.
- Ensuring that consumers understand the proposition through clear information campaigns and successful pilot schemes.
- A common agreement to the warranty aspect of the vehicles and their battery is necessary, and something that can quickly be agreed upon as low hanging fruit. It must be made explicitly clear, what impact V2X will have on a vehicle's warranty, as it is currently leaving consumers confused and non-committal on buying V2X vehicles.

## Q8. WHICH BARRIERS DO YOU BELIEVE REQUIRE INTERVENTION FROM GOVERNMENT AND WHAT FORM SHOULD THAT INTERVENTION TAKE?

Government should facilitate the adoption of common standards, for global service delivery.

It is also important that there is appropriate market governance that supports BEIS/Ofgem's principles of interoperability, data privacy, grid stability and cyber security. Ultimately creating a level playing ground and protecting consumers.

## Q9. WHAT ACTION SHOULD INDUSTRY OR OTHER STAKEHOLDERS TAKE TO ADDRESS THE BARRIERS IDENTIFIED?

Industry should be driving forward with standardising the V2X charging technology, enabling a coordinated and singular approach to V2X for consumers, including open data models. The automotive and energy sectors must come together in order to scale up the technology landscape, including agreeing a singular approach to the power electronics location and whether they will be AC or DC. Additionally, the automotive industry must provide a singular approach to V2X connectors allowing a greater range of vehicle choice for consumers.



## Q10. WHERE SHOULD FUTURE INNOVATION FUNDING BE FOCUSED TO MOST AID THE DEVELOPMENT AND DEPLOYMENT OF V2X ENERGY TECHNOLOGIES?

Future innovation funding should be directed to pilot schemes to enable V2X success stories, ensuring cooperation between the stakeholders required for a joined-up approach. This would most aid the development of V2X technologies as it could immediately quell some of the information barriers that are currently a worry for the consumers, as well as creating the cooperation between industry sectors that is necessary.