

Turbocharging the UK's Economy in Pursuit of Net Zero

An exclusive, interactive day of learning and debate, where the UK's leaders in business, the public sector, academia and politics will collaborate to drive UK economic growth through sustainability and climate action.

Breakout group conversations are focused on tangible growth opportunities for the UK. This document provides a briefing on the growth opportunity you will be exploring in the breakout group you have been assigned to during the 13:30 to 15:15 slot.



Cement vehicle-2-grid capability as the norm for all new vehicles and charge points

- V2G technology allows electric vehicle batteries to release energy to the power grid during high-demand periods and recharge during low-demand periods using renewable energy sources. This can help prevent the need for expensive investments in additional power generation capacity and grid infrastructure, especially when combined with other distributed energy resources like rooftop solar and battery storage.
- The growing reliance on wind and solar energy to meet net zero targets presents grid challenges due to the fluctuating nature of their generation. V2G technology provides an optimal solution to **ease grid capacity limitations and offer flexibility to the power system.**
- Efficient roll-out of V2G technology will require **coordinated solutions.** The strong interdependencies between different facets of the V2G system mean that delay or insufficient action in one area has the potential to prevent or impede progress in this area.
- V2G technology has the potential to add huge value to the UK's power system and support a cost-effective transition to a low-carbon future.
- By 2035, the UK could have almost 20 million EVs on the road. If **all these vehicles were V2G enabled**, this would open up **1.6 TWh of flexible EV discharging capacity**, equivalent to the UK's approximate **total electricity demand over a 2-day period.**
- According to a study funded by OZEV and DESNZ, V2G has the capacity to generate annual savings of **£3.5 billion** by supporting during high-demand periods, thereby reducing the need for investments in grid infrastructure reinforcement and generation.
- Studies have investigated the income-generating potential of V2G technologies for car owners. These suggest that car owners could earn between **£400 and £1,140 per year**, considering that vehicles are typically parked for around 90 percent of the time.
- The UK's early embrace of V2G technology **positions it as a pioneer**, offering domestic companies a competitive edge and paving the way for exporting V2G solutions.

In your breakout group you will...

- **Discuss the size of this opportunity** for the UK with a cross-industry group of leaders
- **Consider the barriers** that are currently getting in the way of the UK realising this opportunity
- **Explore the levers** that breakout group participants could pull to overcome these barriers
- **Identify opportunities** to work together with other breakout group participants to accelerate progress



Adopting V2G as the standard faces substantial barriers, including technology development and infrastructure challenges.

Overcoming these obstacles necessitates concentrated efforts and collaboration among stakeholders such as regulatory authorities, distribution network operators, energy suppliers, electricity system operators, charging equipment manufacturers, and vehicle manufacturers.

By joining forces can we unlock the energy potential of V2G users and propel the widespread adoption of this transformative technology?

Barriers to vehicle-2-grid capability as the norm for all new vehicles and charge points

Technology

There are some key areas in which technology advancements have been holding back the deployment of V2G:

1. Standardising V2G technologies - Ensuring **standardisation** and **interoperability** across different vehicle manufacturers and charging infrastructure providers is essential. Establishing common protocols and technical standards for charging equipment and batteries such as ISO 15118 will enable **seamless integration** and **widespread adoption of V2G capability** while ensuring compatibility with future generations of EVs will be maintained through upgradeability.
2. The main **obstacle** to a nationwide solution is the **central power grid**, which needs to be addressed. However, it may still be possible to implement V2G technology at the regional or local level through **distribution network operators** (DNOs).
3. The use of **bidirectional charging** for V2G technology can impact energy and grid security by reducing the need for additional power generation capacity and grid infrastructure investments, while also enabling the integration of renewable energy sources.

Infrastructure

The successful implementation of V2G technology relies heavily on the development of **smart grids**. Upgrading the grid infrastructure to support V2G technology requires significant investments and careful planning. These advanced grid systems leverage data analytics and real-time communication to **efficiently manage energy supply and demand**. Smart grids are essential for coordinating the bidirectional flow of electricity between EVs and the grid, ensuring optimal grid stability and reliability. This would mean developing several **international standards** and building it onto the cars, chargers and the grid.

The UK Government is making significant investments in upgrading its grid infrastructure to accommodate V2G technology. This includes the installation of **smart metres, grid sensors, and communication networks** that enable seamless interaction between EVs and the grid. There is a need for continuous collaboration between the different stakeholders in the energy network such as the distribution network operators, energy suppliers to implement this capability.

Business Model

Developing a business model for V2G faces several barriers. The market for V2G is currently small, so encouraging consumer uptake is crucial for vehicle and charging equipment manufacturers to make it the norm. There is a **lack of understanding** of the economics of the technology, including potential revenue streams and costs. In addition, financing V2G projects poses a barrier due to the significant upfront investment required for infrastructure. To achieve success in V2G technology, it is important to recognise that multiple business models need to work together, rather than relying on a single model to handle the entire value chain. This approach acknowledges the **need for collaboration and partnerships** among different stakeholders to achieve a successful implementation of V2G technology.

To overcome these barriers, businesses can conduct **thorough market research** to identify revenue streams and costs. They can develop targeted marketing strategies tailored to the preferences of potential customers. Engaging with **policymakers and regulators** can help shape the regulatory environment. Also, providing **financial incentives** like grants, subsidies, or tax credits can encourage the adoption of V2G technology.

Regulation

The current regulatory framework may not fully accommodate the unique requirements and benefits of V2G, hindering its integration into the energy landscape. This **lack of regulatory support** can create uncertainty for businesses and hinder the development of a viable business model. Additionally, unclear guidelines and processes for grid connection such as G99 applications and export Meter Point Administration Numbers can hinder the widespread uptake of V2G.

To overcome this barrier, it is crucial to engage with policymakers and regulators to advocate for supportive regulations that incentivise V2G participation and grid integration. This can include **tariff structures that reward V2G users**, streamlined processes for grid connection and certification, and **clear guidelines** on the rights and responsibilities of V2G stakeholders. By actively collaborating with regulatory authorities, industry stakeholders can help shape a more favourable regulatory environment that encourages the development and deployment of V2G technology.

In room facilitators:

Sponsor: Sarah Noble, Partner - *Consumer Transformation Lead* and Jamie Hamilton, Partner - *UK Electric Mobility Lead*

SME: Walter Carlton, Partner – *Risk Advisory, Transport, Mobility and ER&I specialist*

SME: Susan H McDonald, *Consulting*

Insights Lead: Bhawna Thakur and Anu Thomas, *Consulting*

Additional Resources:

[UK EV charging infrastructure update \(part 2\): Show me the money](#), Deloitte 2021