FINULENT SOLUTIONS

GRID REVOLUTION

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Grid **Revolution**

Electric Vehicles (EVs) are not just a means of getting around but also a key pillar in the energy framework. Vehicle-to-Grid (V2G) technology allows electric vehicles to take power from the grid as well as put electricity back into it, in effect converting them with batteries or fuel cells into mobile power plants. This two-way energy supply continually finds innovative ways to correct the disparity between energy needs and resources.

Global Market **Overview**

- **Market Valuation:** The global V2G market is valued to grow by $1.49 billion in 2025, and reach $6.73 billion by 2033, representing a CAGR of 20.2%.

- **Regional Insights:** Asia Pacific dominated the global market with a share of 57.42% in 2023, attributed to the rapid adoption of EVs and supportive government policies in countries like China, Japan, and South Korea.

- **Technological Advancements:** The increased use of bi-directional charging infrastructure and developments in smart grid technology both are important drivers for the growth in this market at present.

V2G in Action

United States

- **Oakland Unified School District:** In August 2024, the Oakland Unified School District commenced operation of 74 fully electric school buses equipped with V2G technology. Bearing 1300 special needs students, these buses not only reduce emissions but also give back power stores to the grid at peak demand periods and help stabilise the grid.

France

- **Renault's V2G Initiative:** Renault's new E-Tech models, including the Renault 5 E-Tech, are equipped with V2G capabilities. Owners can supply electricity back to the grid, potentially earning up to €200 annually, provided the vehicle is plugged in for 9 hours daily and covers 15,000 kilometres annually.

Australia

- **CSIRO's V2G Simulation:** In April 2025, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) successfully simulated household energy consumption using V2G technology. Use of V2G technology in the experiment has proven that electric vehicles have the potential to stabilise the grid as well as reduce energy costs for consumers.

India

- **North Delhi Pilot Project:** Tata Power Delhi Distribution Limited and the India Smart Grid Forum jointly launched a V2G demonstration project at North Delhi in May 2024. The aim of the project is to increase grid stability and EV benefits in urban settings.

Technological **Collaborations**

- **ChargeScape Initiative:** The ChargeScape Initiative for electric vehicles and utility companies was established by Nissan, BMW, Ford and Honda. It is expected that this ongoing collaboration will be used to control home charging and, at times of peak consumption, return power to the network. This is a way of optimising energy use and reducing costs.

- **Vehicle Compatibility:** The manufacturers Ford, Hyundai and Volkswagen have all incorporated V2G functions into their models, such as the F-150 Lightning, IONIQ 5 and ID series, etc. And these vehicles support ISO-15118. They enable bidirectional energy flow to take place without interruption of service.

Challenges and **Considerations**

- **Infrastructure Investment:** For V2G deployment to become widespread, it is necessary that bi-directional charging plugs and distribution lines with the capability to handle these split-second changes be put in place.

- **Regulatory Frameworks:** The absence of standardised regulations and policies governing V2G operations poses challenges for integration and scalability.

- **Consumer Awareness:** Lack of understanding among consumers about what V2G technology can bring them and exactly how it's used inhibits its adoption. It is essential that educational initiatives cover this knowledge gap.

V2G technology embodies a disruptive way to manage energy while directing the fast EV market to improve grid resilience and facilitate renewable energy integration. Ongoing collaboration between automakers, utilities, and policymakers will be important in addressing existing challenges and harnessing the full potential of V2G.

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