

# **Vehicle-To-Grid (V2G) Technology Market Forecasts to 2032 – Global Analysis By Component (Electric Vehicles (EVs), Charging Stations, Smart Inverters, Software Solutions, Communication Systems and Other Components), Charging Type, Vehicle Type, Application and By Geography**

<https://marketpublishers.com/r/V0D6CBE627F1EN.html>

Date: July 2025

Pages: 150

Price: US\$ 4,150.00 (Single User License)

ID: V0D6CBE627F1EN

## **Abstracts**

According to Statistics MRC, the Global Vehicle-To-Grid (V2G) Technology Market is accounted for \$4.48 billion in 2025 and is expected to reach \$47.22 billion by 2032 growing at a CAGR of 40% during the forecast period. Electric vehicles (EVs) and the power grid may exchange energy in both directions thanks to technology known as vehicle-to-grid (V2G). It improves grid stability and energy efficiency by enabling EVs to store extra electricity and feed it back into the system during times of high demand. V2G promotes the integration of renewable energy sources, lowers power costs, and balances load. EVs with V2G are an essential part of smart grid and clean energy projects because they serve as mobile energy storage devices, enhancing the resilience and sustainability of the energy ecosystem.

According to the research conducted by the University of Warwick, the utilization of vehicle to grid for charging and discharging electric vehicle batteries does not necessarily harm the performance and capacity of the battery over time, on the other hand, it may increase its life span.

Market Dynamics:

Driver:

## Grid stability & renewable integration

During peak hours, V2G systems transmit stored energy from EVs back to the grid, helping to balance the supply and demand for electricity. This feature helps stabilise the system by facilitating the incorporation of sporadic renewable energy sources like wind and solar. As distributed energy resources, EVs lessen the requirement for modifications to the conventional grid infrastructure. In order to control voltage fluctuations and frequency regulation, utilities and grid operators are using V2G systems more and more. The need for V2G technology is increasing in tandem with the use of renewable energy.

### Restraint:

#### Battery degradation concerns

The longevity of V2G systems is shortened by frequent cycles of charging and discharging, which accelerate battery wear. For EV owners who worry about having to replace their batteries too soon, this creates financial issues. Because of the potential effects on warranty and performance, manufacturers are reluctant to fully enable V2G integration. Potential users are further discouraged by the lack of clarity on long-term battery health effects. These worries thus lead to consumer resistance and a slower rate of market adoption.

### Opportunity:

#### Revenue streams for aggregators & utilities

During periods of high demand, aggregators make money by combining the energy from EVs and selling it to the grid. Reduced grid congestion and postponed expensive infrastructure upgrades are advantageous to utilities. Infrastructure investment and more EV integration are encouraged by this revenue potential. Additionally, EV users can benefit from intelligent charging and discharging through time-of-use pricing schemes. In general, market adoption and V2G implementation are accelerated by stakeholder profitability.

### Threat:

#### Competition from alternative storage

The allure of employing electric vehicles for grid services is diminished by these substitutes, which frequently have longer lifespans and superior energy efficiency. Furthermore, centralised storage solutions might be preferred by utilities and grid operators due to their ease of integration and control. The competitiveness of V2G is further restricted by the expensive initial investment and infrastructure required. Adoption is also hampered by technological concerns and problems with interoperability with existing EVs. Consequently, the expansion of the V2G industry is slowed down by the existence of established alternatives.

### Covid-19 Impact

The COVID-19 pandemic had a mixed impact on the Vehicle-To-Grid (V2G) technology market. Initial disruptions in automotive production, supply chain breakdowns, and decreased electric vehicle (EV) adoption due to economic uncertainty slowed market growth. However, the pandemic also accelerated digital transformation and highlighted the need for resilient energy infrastructure. Governments increased investments in green technologies and sustainable mobility, indirectly supporting V2G initiatives. Post-pandemic recovery has driven renewed interest in EVs and energy management, positively influencing the V2G market trajectory.

The charging stations segment is expected to be the largest during the forecast period

The charging stations segment is expected to account for the largest market share during the forecast period, due to the essential infrastructure for bidirectional energy flow. These stations enable electric vehicles (EVs) to not only receive power but also supply excess energy back to the grid. The expansion of fast-charging and smart charging networks accelerates V2G integration into urban and residential areas. Government incentives and private investments in EV infrastructure further drive the deployment of V2G-enabled charging stations. This growth supports grid stability and energy efficiency, making V2G technology more viable and attractive to consumers and utilities alike.

The emergency backup power segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the emergency backup power segment is predicted to witness the highest growth rate by offering reliable energy during grid outages. Electric vehicles (EVs) equipped with V2G capabilities can supply stored power to homes, businesses, or critical infrastructure when needed. This dual-use functionality enhances the value

proposition of EVs, encouraging wider adoption. Increasing natural disasters and power grid instabilities further drive demand for V2G as a decentralized backup solution. As a result, energy resilience becomes a key driver for market growth in this segment.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share due to robust EV adoption, government subsidies, and grid modernization initiatives in countries like China, Japan, and South Korea. These nations are integrating renewable energy with smart grid systems, enhancing the role of V2G in balancing electricity demand and storage. Japan remains a leader with its early deployment of V2G-compatible EVs and home-charging systems. Collaborations between automakers and utility providers, along with supportive policies for bidirectional charging, are further propelling market growth and infrastructure development in the region.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR by regulatory challenges, fragmented utility structures, and limited infrastructure readiness. While the U.S. and Canada show growing interest, deployments remain largely in pilot stages. Federal incentives and funding under clean energy acts aim to boost adoption, but commercial scalability is yet to be achieved. Partnerships between utilities and automakers like Ford and GM are initiating pilot programs, especially in California and New York, yet widespread V2G implementation faces hurdles in standardization and consumer awareness.

Key players in the market

Some of the key players profiled in the Vehicle-To-Grid (V2G) Technology Market include NUVVE Holding Corp., Denso Corporation, ABB Ltd., The Mobility House GmbH, Hitachi Energy Ltd., Mitsubishi Electric Corporation, Toyota Motor Corporation, Honda Motor Co., Ltd., Tesla, Inc., EVBox Group, Fermata Energy, NextEra Energy, Inc., Siemens AG, Wallbox Chargers, S.L. and Hyundai Motor Company.

Key Developments:

In May 2025, Denso and ROHM Co., Ltd. reached a basic agreement to establish a strategic partnership in the semiconductor field, focusing on enhancing analog ICs

critical for vehicle electrification and intelligence. This collaboration is expected to support next-generation vehicle systems, including electrification and automated driving, which are foundational for V2G technologies.

In January 2025, NUVVE launched a new product line of advanced bidirectional and unidirectional chargers ranging from 20 kW to 360 kW. These chargers are designed for diverse applications including school buses, commercial fleets, public infrastructure, and microgrids.

In October 2024, NUVVE collaborated with Exelon's Delmarva Power to demonstrate the industry's first three-phase AC Vehicle-to-Grid (V2G) chargers using Ford Mach-E vehicles, operating under the SAE J3068/2 standard, showcasing cost-effective, scalable grid services from electric vehicles.

#### Components Covered:

Electric Vehicles (EVs)

Charging Stations

Smart Inverters

Software Solutions

Communication Systems

Other Components

#### Charging Types Covered:

Unidirectional Charging (V1G)

Bidirectional Charging (V2G)

#### Vehicle Types Covered:

Passenger Vehicles

Commercial Vehicles

Electric Buses

Electric Two-Wheelers

Heavy-Duty Vehicles

Applications Covered:

Peak Load Management

Emergency Backup Power

Frequency Regulation

Renewable Energy Integration

Energy Trading

Vehicle Fleets

Residential Use

Commercial Use

Other Applications

Regions Covered:

North America

US

Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

## Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

## Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

## Contents

### **1 EXECUTIVE SUMMARY**

### **2 PREFACE**

- 2.1 Abstract
- 2.2 Stake Holders
- 2.3 Research Scope
- 2.4 Research Methodology
  - 2.4.1 Data Mining
  - 2.4.2 Data Analysis
  - 2.4.3 Data Validation
  - 2.4.4 Research Approach
- 2.5 Research Sources
  - 2.5.1 Primary Research Sources
  - 2.5.2 Secondary Research Sources
  - 2.5.3 Assumptions

### **3 MARKET TREND ANALYSIS**

- 3.1 Introduction
- 3.2 Drivers
- 3.3 Restraints
- 3.4 Opportunities
- 3.5 Threats
- 3.6 Application Analysis
- 3.7 Emerging Markets
- 3.8 Impact of Covid-19

### **4 PORTERS FIVE FORCE ANALYSIS**

- 4.1 Bargaining power of suppliers
- 4.2 Bargaining power of buyers
- 4.3 Threat of substitutes
- 4.4 Threat of new entrants
- 4.5 Competitive rivalry

### **5 GLOBAL VEHICLE-TO-GRID (V2G) TECHNOLOGY MARKET, BY COMPONENT**

- 5.1 Introduction
- 5.2 Electric Vehicles (EVs)
  - 5.2.1 Battery Electric Vehicles (BEVs)
  - 5.2.2 Plug-in Hybrid Electric Vehicles (PHEVs)
  - 5.2.3 Fuel Cell Electric Vehicles (FCEVs)
- 5.3 Charging Stations
- 5.4 Smart Inverters
- 5.5 Software Solutions
- 5.6 Communication Systems
- 5.7 Other Components

## **6 GLOBAL VEHICLE-TO-GRID (V2G) TECHNOLOGY MARKET, BY CHARGING TYPE**

- 6.1 Introduction
- 6.2 Unidirectional Charging (V1G)
- 6.3 Bidirectional Charging (V2G)

## **7 GLOBAL VEHICLE-TO-GRID (V2G) TECHNOLOGY MARKET, BY VEHICLE TYPE**

- 7.1 Introduction
- 7.2 Passenger Vehicles
- 7.3 Commercial Vehicles
- 7.4 Electric Buses
- 7.5 Electric Two-Wheelers
- 7.6 Heavy-Duty Vehicles

## **8 GLOBAL VEHICLE-TO-GRID (V2G) TECHNOLOGY MARKET, BY APPLICATION**

- 8.1 Introduction
- 8.2 Peak Load Management
- 8.3 Emergency Backup Power
- 8.4 Frequency Regulation
- 8.5 Renewable Energy Integration
- 8.6 Energy Trading
- 8.7 Vehicle Fleets
- 8.8 Residential Use
- 8.9 Commercial Use

## 8.10 Other Applications

# 9 GLOBAL VEHICLE-TO-GRID (V2G) TECHNOLOGY MARKET, BY GEOGRAPHY

## 9.1 Introduction

## 9.2 North America

### 9.2.1 US

### 9.2.2 Canada

### 9.2.3 Mexico

## 9.3 Europe

### 9.3.1 Germany

### 9.3.2 UK

### 9.3.3 Italy

### 9.3.4 France

### 9.3.5 Spain

### 9.3.6 Rest of Europe

## 9.4 Asia Pacific

### 9.4.1 Japan

### 9.4.2 China

### 9.4.3 India

### 9.4.4 Australia

### 9.4.5 New Zealand

### 9.4.6 South Korea

### 9.4.7 Rest of Asia Pacific

## 9.5 South America

### 9.5.1 Argentina

### 9.5.2 Brazil

### 9.5.3 Chile

### 9.5.4 Rest of South America

## 9.6 Middle East & Africa

### 9.6.1 Saudi Arabia

### 9.6.2 UAE

### 9.6.3 Qatar

### 9.6.4 South Africa

### 9.6.5 Rest of Middle East & Africa

# 10 KEY DEVELOPMENTS

## 10.1 Agreements, Partnerships, Collaborations and Joint Ventures

- 10.2 Acquisitions & Mergers
- 10.3 New Product Launch
- 10.4 Expansions
- 10.5 Other Key Strategies

## **11 COMPANY PROFILING**

- 11.1 Nuvve Holding Corp.
- 11.2 Denso Corporation
- 11.3 ABB Ltd.
- 11.4 The Mobility House GmbH
- 11.5 Hitachi Energy Ltd.
- 11.6 Mitsubishi Electric Corporation
- 11.7 Toyota Motor Corporation
- 11.8 Honda Motor Co., Ltd.
- 11.9 Tesla, Inc.
- 11.10 EVBox Group
- 11.11 Fermata Energy
- 11.12 NextEra Energy, Inc.
- 11.13 Siemens AG
- 11.14 Wallbox Chargers, S.L.
- 11.15 Hyundai Motor Company

## List Of Tables

### LIST OF TABLES

Table 1 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Region (2024-2032) (\$MN)

Table 2 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Component (2024-2032) (\$MN)

Table 3 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Electric Vehicles (EVs) (2024-2032) (\$MN)

Table 4 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Battery Electric Vehicles (BEVs) (2024-2032) (\$MN)

Table 5 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Plug-in Hybrid Electric Vehicles (PHEVs) (2024-2032) (\$MN)

Table 6 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Fuel Cell Electric Vehicles (FCEVs) (2024-2032) (\$MN)

Table 7 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Charging Stations (2024-2032) (\$MN)

Table 8 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Smart Inverters (2024-2032) (\$MN)

Table 9 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Software Solutions (2024-2032) (\$MN)

Table 10 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Communication Systems (2024-2032) (\$MN)

Table 11 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Other Components (2024-2032) (\$MN)

Table 12 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Charging Type (2024-2032) (\$MN)

Table 13 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Unidirectional Charging (V1G) (2024-2032) (\$MN)

Table 14 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Bidirectional Charging (V2G) (2024-2032) (\$MN)

Table 15 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Vehicle Type (2024-2032) (\$MN)

Table 16 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Passenger Vehicles (2024-2032) (\$MN)

Table 17 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Commercial Vehicles (2024-2032) (\$MN)

Table 18 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Electric Buses

(2024-2032) (\$MN)

Table 19 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Electric Two-Wheelers (2024-2032) (\$MN)

Table 20 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Heavy-Duty Vehicles (2024-2032) (\$MN)

Table 21 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Application (2024-2032) (\$MN)

Table 22 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Peak Load Management (2024-2032) (\$MN)

Table 23 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Emergency Backup Power (2024-2032) (\$MN)

Table 24 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Frequency Regulation (2024-2032) (\$MN)

Table 25 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Renewable Energy Integration (2024-2032) (\$MN)

Table 26 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Energy Trading (2024-2032) (\$MN)

Table 27 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Vehicle Fleets (2024-2032) (\$MN)

Table 28 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Residential Use (2024-2032) (\$MN)

Table 29 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Commercial Use (2024-2032) (\$MN)

Table 30 Global Vehicle-To-Grid (V2G) Technology Market Outlook, By Other Applications (2024-2032) (\$MN)

Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

## I would like to order

Product name: Vehicle-To-Grid (V2G) Technology Market Forecasts to 2032 – Global Analysis By Component (Electric Vehicles (EVs), Charging Stations, Smart Inverters, Software Solutions, Communication Systems and Other Components), Charging Type, Vehicle Type, Application and By Geography

Product link: <https://marketpublishers.com/r/V0D6CBE627F1EN.html>

Price: US\$ 4,150.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/V0D6CBE627F1EN.html>