

Virtual Power Plant Market by Technology (Demand Response, Supply Side, Mixed Asset), Vertical (Commercial, Industrial, Residential), Source (Renewable Energy, Storage, Cogeneration), Offering, & Region- Global Forecast to 2029

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Abstracts

The global virtual power plant (VPP) market is forecast to reach USD 5.5 billion by 2029 from an estimated USD 1.9 billion in 2024, at a CAGR of 23.4% during the forecast period (2024-2029). The rise in the demand for decarbonization of power distribution systems, and need to mitigate impact of intermittent renewable sources is driving the market.

“Mixed Asset: The second largest segment of the virtual power plant market, by technology.”

Based on technology, the virtual power plant market has been split into three types: Demand Response, Supply Side, and Mixed Asset. Mixed Asset is expected to be the second largest segment in the market. A mixed asset virtual power plant (VPP) is a sophisticated energy system that integrates both demand-side and supply-side resources to optimize energy consumption and production, resulting in a highly flexible energy system. These features are driving the market for mixed asset segment.

“Industrial segment is expected to emerge as the second-fastest segment based on vertical.”

Based on vertical, the virtual power plant market has been segmented into commercial, industrial, and residential. In the industrial sector, revolutionizing the way industrial facilities manage their energy consumption. These sophisticated systems aggregate

diverse distributed energy resources (DERs), encompassing both renewable and fuel-based units, allowing industrial facilities to actively participate in energy exchange markets and optimize their energy usage dynamically. These factors are driving the segment making it as the second-fastest segment in the market.

“Asia Pacific is expected to be the fastest region in the virtual power plant market.”

Asia Pacific is expected to be the fastest region in the virtual power plant markets between 2024–2029. The market in Asia Pacific comprises Australia, South Korea, Japan, Rest of Asia Pacific countries. The growth of the VPP market in the Asia Pacific region is largely supported by strong government backing for clean energy initiatives, as well as the region's well-established power grids that are favorable for VPP and renewable energy integration. The ongoing development of VPP infrastructure is aligned with the region's commitment to meet the growing energy demands.

Breakdown of Primaries:

In-depth interviews have been conducted with various key industry participants, subject-matter experts, C-level executives of key market players, and industry consultants, among other experts, to obtain and verify critical qualitative and quantitative information, as well as to assess future market prospects. The distribution of primary interviews is as follows:

By Company Type: Tier 1- 45%, Tier 2- 30%, and Tier 3- 25%

By Designation: C-Level- 35%, Director Levels- 25%, and Others- 40%

By Region: North America- 33%, Europe- 27%, Asia Pacific- 20%, the Middle East & Africa- 12%, and South America- 8%

Note: Others include product engineers, product specialists, and engineering leads.

Note: The tiers of the companies are defined on the basis of their total revenues as of 2021. Tier 1: > USD 1 billion, Tier 2: From USD 500 million to USD 1 billion, and Tier 3: The virtual power plant market is dominated by a few major players that have a wide regional presence. The leading players in the refinery and petrochemical filtration market are Siemens (Germany), Schneider Electric (France), General Electric (US), Shell (UK), Tesla (US).

Research Coverage:

The report defines, describes, and forecasts the global Virtual power plant market, by type, by component, by voltage, by services, end user and region. It also offers a detailed qualitative and quantitative analysis of the market. The report provides a comprehensive review of the major market drivers, restraints, opportunities, and challenges. It also covers various important aspects of the market. These include an analysis of the competitive landscape, market dynamics, market estimates, in terms of value, and future trends in the virtual power plant market.

Key Benefits of Buying the Report

Seamless integration with renewable sources such as solar and wind, Need to mitigate impact of intermittent renewable sources, and decarbonization of power distribution systems to drive the demand. Factors such as Requirement of high investments to deploy monitoring and control systems and predictive analysis hinder market growth. Increasing installation of smart grids offer lucrative opportunities in this market. Integration of different hardware and software components in VPPs, Cybersecurity threats due to use of digital infrastructure and communication networks are major challenges faced by countries in this market.

Product Development/ Innovation: The trends such as the integration of AI and ML algorithms is a pivotal trend in VPP development. These technologies contribute to the optimization of energy generation and consumption, boosting efficiency and cost-effectiveness. VPPs dynamically optimize their performance by employing real-time data analysis, ensuring responsiveness to varying energy demands and supply conditions. Secured data connections, often facilitated through wireless channels, form the backbone of VPP communication. This infrastructure enables the transmission of control commands and data between the central control system and connected assets in real time, allowing for effective monitoring and performance analysis.

Market Development: The development of virtual power plant is essential to achieve shared goals for energy security, economic development, and climate change mitigation. Smart grids enable increased demand response and energy efficiency, integration of variable renewable energy resources into the power grid infrastructure while reducing peak demand and stabilizing the electricity system.

Market Diversification: Schnedier Electric's VPP4 Islands is a 4-year project aiming to smoothen the integration of renewable generation systems, promote the transition to smarter and cleaner energy, and help islands exploit different approaches to energy efficiency and innovative storage.

Competitive Assessment: In-depth assessment of market shares, growth strategies, and service offerings of leading players like Siemens (Germany), Schneider Electric (France), General Electric (US), Shell (UK), Tesla (US) among others in the virtual power plant market.

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*Details on Business overview, Products /Solutions/Services offered, Recent developments, Deals, MnM view, Key strengths/Right to win, Strategic choices made, and Weaknesses and Competitive threats might not be captured in case of unlisted companies.

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