

United States Data Center Genset Market By Type (Diesel Generators, Gas Generators, Hybrid Generators), By Power Rating (Up to 500 kVA, 501 kVA to 1000 kVA, Above 1000 kVA), By End-User (Colocation Data Centers, Enterprise Data Centers, Cloud Service Providers), By Region, Competition, Forecast and Opportunities, 2019-2029F

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Abstracts

United States Data Center Genset Market was valued at USD 3.12 billion in 2023 and is anticipated to project robust growth in the forecast period with a CAGR of 7.94% through 2029.

The United States Data Center Generator Set, commonly known as genset, refers to a power generation system designed to provide backup or primary power to data centers in case of an electrical outage or failure. These systems are crucial for ensuring uninterrupted operation of data centers, which house critical IT infrastructure and handle vast amounts of data. The market for data center gensets in the United States is anticipated to rise significantly due to several key factors. First, the rapid expansion of data centers driven by the growing demand for cloud computing, big data, and digital services necessitates reliable power backup solutions to maintain operational continuity and protect against data loss or service disruptions. As data centers become more integral to various industries, the need for high-capacity and efficient gensets increases. Second, increasing awareness of the potential risks associated with power outages, including financial losses and operational downtime, is prompting data center operators to invest in robust genset solutions that ensure continuous power supply. Additionally, advancements in genset technologies, such as improved fuel efficiency, reduced emissions, and enhanced

performance, are making these systems more attractive to data center operators. Government regulations and standards aimed at reducing environmental impact and promoting energy efficiency also drive the adoption of advanced genset solutions. Furthermore, the rise in natural disasters and extreme weather events underscores the importance of having reliable backup power sources. As data centers continue to grow in size and complexity, and as the reliance on digital infrastructure intensifies, the demand for data center gensets in the United States is expected to increase, driven by the need for dependable and efficient power solutions to support the ever-expanding digital landscape.

Key Market Drivers

Growing Demand for Data Centers

The increasing demand for data centers in the United States is a significant driver for the data center generator set market. As digital transformation accelerates across industries, the need for data centers to support cloud computing, big data analytics, and internet of things applications is expanding. This surge in data center growth necessitates reliable backup power solutions to ensure continuous operation and mitigate risks associated with power outages. Data centers are critical infrastructure that must maintain operational uptime to prevent data loss and service disruptions. As organizations invest heavily in expanding their data center capacity to handle increasing volumes of data, the demand for high-capacity and efficient generator sets rises. These generator sets provide the necessary power continuity, safeguarding data integrity and maintaining business continuity. Moreover, the proliferation of edge computing, which brings computing resources closer to the end-user, also contributes to the growing number of smaller data centers that require reliable backup power solutions. The increasing complexity and scale of data center operations underscore the need for sophisticated generator sets capable of supporting high-performance computing environments.

Stringent Regulatory and Compliance Requirements

Stringent regulatory and compliance requirements related to data center operations are driving the growth of the data center generator set market. In the United States, data centers are subject to various regulations and standards designed to ensure operational reliability and environmental responsibility. Regulatory frameworks such as the National Fire Protection Association standards, the Occupational Safety and Health Administration requirements, and state-specific environmental regulations mandate that

data centers maintain robust backup power systems. Compliance with these regulations often requires the installation of high-quality generator sets capable of delivering reliable and efficient power during outages. Additionally, regulations aimed at reducing emissions and promoting energy efficiency are encouraging the adoption of advanced generator technologies. Data center operators must ensure that their backup power systems meet these regulatory standards while also aligning with broader sustainability goals. As compliance becomes increasingly stringent, the demand for generator sets that adhere to these requirements and provide dependable performance continues to grow, driving market expansion.

Technological Advancements in Generator Sets

Technological advancements in generator set technology are a key driver of growth in the data center generator set market. Innovations in generator design and performance, such as improvements in fuel efficiency, emissions reduction, and operational reliability, are enhancing the attractiveness of modern generator sets for data center applications. Advances in digital control systems, remote monitoring capabilities, and automatic load management are making generator sets more efficient and easier to integrate into data center operations. For instance, newer generator sets offer better fuel efficiency and reduced operational costs through advanced technologies such as hybrid power solutions and intelligent control systems. Additionally, advancements in noise reduction technologies and emissions control are addressing environmental and regulatory concerns, making modern generator sets more compliant with stringent regulations. As data centers seek to optimize their power backup solutions and improve their overall efficiency, the adoption of these advanced generator technologies is expected to increase, fueling market growth.

Key Market Challenges

High Initial Capital and Maintenance Costs

One of the major challenges facing the United States data center generator set market is the high initial capital investment and ongoing maintenance costs. The acquisition and installation of high-capacity generator sets represent a substantial financial commitment for data center operators. These systems, particularly those with advanced features and high power ratings, require significant expenditure not only for the units themselves but also for associated infrastructure, including fuel storage, exhaust systems, and soundproofing. Moreover, the cost of routine maintenance, including regular inspections, servicing, and potential repairs, adds to the overall expense.

Maintaining generator sets in optimal condition is crucial to ensure their reliability and longevity, which necessitates skilled technicians and adherence to manufacturer guidelines. The financial burden associated with these costs can be particularly challenging for smaller data center operators or those with limited budgets. Additionally, the high costs can impact the overall return on investment, making it a significant consideration for decision-makers when planning data center operations. As a result, the substantial capital and operational expenditures associated with generator sets can constrain market growth and influence purchasing decisions, presenting a notable challenge for the industry.

Environmental and Regulatory Compliance

Navigating the complex landscape of environmental and regulatory compliance is another significant challenge for the data center generator set market in the United States. Data center generator sets must adhere to a range of stringent regulations aimed at minimizing environmental impact and ensuring operational safety. These regulations encompass emissions standards, noise restrictions, and fuel handling requirements, among others. Compliance with these regulations often necessitates the use of advanced, and sometimes costly, technologies designed to reduce emissions and meet other environmental criteria. For example, generator sets must be equipped with technologies that control nitrogen oxides, particulate matter, and other pollutants to meet federal and state emissions standards. Additionally, noise abatement measures may be required to address concerns related to the operational noise of generator sets. The complexity and cost of meeting these regulatory requirements can pose significant challenges for data center operators. Ensuring compliance not only involves substantial financial investment in advanced equipment and technologies but also requires ongoing monitoring and reporting. The evolving nature of environmental regulations further complicates compliance efforts, as data center operators must continuously adapt to new standards and requirements. This regulatory burden represents a critical challenge for the market, influencing operational decisions and affecting overall cost structures.

Key Market Trends

Increasing Adoption of Sustainable and Hybrid Generator Technologies

A significant trend in the United States data center generator set market is the increasing adoption of sustainable and hybrid generator technologies. As data centers strive to align with broader corporate sustainability goals and reduce their

environmental impact, there is a growing emphasis on integrating more eco-friendly power solutions. Hybrid generator systems, which combine traditional diesel generators with alternative energy sources such as natural gas, solar power, or battery storage, are gaining traction. These systems offer the dual benefits of reducing carbon emissions and enhancing fuel efficiency. Additionally, advancements in generator technology are leading to the development of more efficient, low-emission engines that comply with stringent environmental regulations. This trend is driven by both regulatory pressures and the desire for operational cost savings, as hybrid and sustainable generator systems often lead to reduced fuel consumption and lower maintenance requirements. Data center operators are increasingly looking to incorporate these technologies to meet sustainability targets, achieve regulatory compliance, and enhance their overall operational efficiency. The shift towards hybrid and sustainable solutions reflects the industry's broader commitment to environmental stewardship and operational excellence.

Enhanced Remote Monitoring and Automation Capabilities

The trend towards enhanced remote monitoring and automation capabilities is transforming the United States data center generator set market. As data centers increasingly rely on sophisticated power management systems, there is a growing demand for generator sets equipped with advanced remote monitoring and control features. These technologies allow operators to track generator performance, diagnose issues, and perform maintenance tasks remotely, thereby improving operational efficiency and reducing downtime. Remote monitoring systems provide real-time data on generator status, fuel levels, and performance metrics, enabling proactive management and timely response to potential issues. Automation technologies further enhance the functionality of generator sets by enabling automatic load management, seamless transition between power sources, and optimized fuel usage. The integration of these advanced technologies helps data center operators to minimize manual intervention, reduce the risk of human error, and ensure reliable power supply. As data centers continue to expand and evolve, the demand for intelligent, automated generator systems is expected to grow, driving advancements in remote monitoring and automation technologies.

Focus on Enhanced Reliability and Resilience

Another key trend in the United States data center generator set market is the growing focus on enhanced reliability and resilience. With the increasing importance of data centers in supporting critical applications and services, ensuring uninterrupted power

supply has become a top priority. Data center operators are investing in high-reliability generator systems that offer superior performance and resilience under various conditions. This trend is driven by the need to prevent downtime, protect data integrity, and maintain operational continuity in the face of power outages or disruptions. Advanced generator sets are being designed with features such as redundant components, automatic load sharing, and robust testing protocols to enhance their reliability and ensure consistent performance. Additionally, data centers are adopting strategies such as regular maintenance schedules, comprehensive testing procedures, and contingency planning to further bolster their power backup systems. The emphasis on reliability and resilience reflects the critical role that data centers play in the digital economy and the need for robust solutions to safeguard against power-related challenges. As the demand for uninterrupted data center operations grows, the focus on enhancing generator reliability and resilience is expected to drive innovation and investment in the market.

Segmental Insights

Type Insights

In 2023, the diesel generators segment dominated the United States data center generator set market and is anticipated to maintain its leading position throughout the forecast period. Diesel generators have long been the preferred choice for data centers due to their reliability, high power output, and proven performance in providing backup power during outages. Their robustness and ability to deliver consistent power make them particularly well-suited for the high-demand environments of data centers. Despite the increasing interest in alternative and hybrid technologies, diesel generators continue to be favored for their established track record and the ability to meet the stringent power requirements of data centers. Additionally, advancements in diesel engine technology have improved fuel efficiency and reduced emissions, addressing some of the environmental concerns associated with diesel power. These improvements have further solidified the position of diesel generators as a reliable and effective solution for data center operators. Although gas and hybrid generators are gaining traction due to their environmental benefits and operational flexibility, diesel generators remain the dominant choice due to their proven reliability and the extensive infrastructure supporting their use. As data centers prioritize consistent power supply and operational continuity, the diesel generators segment is expected to retain its dominance, reflecting its critical role in ensuring uninterrupted data center operations.

Regional Insights

In 2023, the West United States region dominated the United States data center generator set market and is expected to sustain its leading position throughout the forecast period. This dominance is attributed to the region's robust technological infrastructure and the presence of major technology hubs and data center clusters, particularly in cities like San Francisco, Los Angeles, and Seattle. The West United States is a significant hub for information technology companies, cloud service providers, and digital enterprises, all of which drive substantial demand for data center facilities and, consequently, for reliable backup power solutions. The region's favorable business environment, technological innovation, and investment in data center infrastructure further bolster its position in the market. Additionally, the West United States is experiencing a rapid expansion of data center operations to accommodate growing data consumption and technological advancements, reinforcing the need for high-performance generator sets. The continuous development of data centers and the increasing focus on enhancing operational resilience and power reliability contribute to the sustained demand for generator sets in this region. While other regions such as the South United States, Midwest United States, and North-East United States also contribute to the market, the West United States' concentration of technology-driven enterprises and significant data center investments ensure its dominance and ongoing growth in the data center generator set market.

Key Market Players

Caterpillar Inc

Cummins Inc

General Electric Company

KOHLER Co

Rolls-Royce Holdings plc

Atlas Copco Group

Himoinsa SL

Doosan Bobcat Inc

PR Industrial S.r.l unipersonale

Wartsila Corporation

Report Scope:

In this report, the United States Data Center Genset Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

United States Data Center Genset Market, By Type:

Diesel Generators

Gas Generators

Hybrid Generators

United States Data Center Genset Market, By Power Rating:

Up to 500 kVA

501 kVA to 1000 kVA

Above 1000 kVA

United States Data Center Genset Market, By End-user:

Colocation Data Centers

Enterprise Data Centers

Cloud Service Providers

United States Data Center Genset Market, By Region:

South US

Midwest US

North-East US

West US

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the United States Data Center Genset Market.

Available Customizations:

United States Data Center Genset Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

Contents

1. SERVICE OVERVIEW

- 1.1. Market Definition
- 1.2. Scope of the Market
 - 1.2.1. Markets Covered
 - 1.2.2. Years Considered for Study
 - 1.2.3. Key Market Segmentations

2. RESEARCH METHODOLOGY

- 2.1. Objective of the Study
- 2.2. Baseline Methodology
- 2.3. Formulation of the Scope
- 2.4. Assumptions and Limitations
- 2.5. Sources of Research
 - 2.5.1. Secondary Research
 - 2.5.2. Primary Research
- 2.6. Approach for the Market Study
 - 2.6.1. The Bottom-Up Approach
 - 2.6.2. The Top-Down Approach
- 2.7. Methodology Followed for Calculation of Market Size & Market Shares
- 2.8. Forecasting Methodology
 - 2.8.1. Data Triangulation & Validation

3. EXECUTIVE SUMMARY

4. IMPACT OF COVID-19 ON UNITED STATES DATA CENTER GENSET MARKET

5. VOICE OF CUSTOMER

6. UNITED STATES DATA CENTER GENSET MARKET OVERVIEW

7. UNITED STATES DATA CENTER GENSET MARKET OUTLOOK

- 7.1. Market Size & Forecast
 - 7.1.1. By Value
- 7.2. Market Share & Forecast

- 7.2.1.By Type (Diesel Generators, Gas Generators, Hybrid Generators)
- 7.2.2.By Power Rating (Up to 500 kVA, 501 kVA to 1000 kVA, Above 1000 kVA)
- 7.2.3.By End-User (Colocation Data Centers, Enterprise Data Centers, Cloud Service Providers)
- 7.2.4.By Region
- 7.3. By Company (2023)
- 7.4. Market Map

8. SOUTH UNITED STATES DATA CENTER GENSET MARKET OUTLOOK

- 8.1. Market Size & Forecast
 - 8.1.1.By Value
- 8.2. Market Share & Forecast
 - 8.2.1.By Type
 - 8.2.2.By Power Rating
 - 8.2.3.By End-User

9. MIDWEST UNITED STATES DATA CENTER GENSET MARKET OUTLOOK

- 9.1. Market Size & Forecast
 - 9.1.1.By Value
- 9.2. Market Share & Forecast
 - 9.2.1.By Type
 - 9.2.2.By Power Rating
 - 9.2.3.By End-User

10. NORTH-EAST UNITED STATES DATA CENTER GENSET MARKET OUTLOOK

- 10.1. Market Size & Forecast
 - 10.1.1. By Value
- 10.2. Market Share & Forecast
 - 10.2.1. By Type
 - 10.2.2. By Power Rating
 - 10.2.3. By End-User

11. WEST UNITED STATES DATA CENTER GENSET MARKET OUTLOOK

- 11.1. Market Size & Forecast
 - 11.1.1. By Value

11.2. Market Share & Forecast

11.2.1. By Type

11.2.2. By Power Rating

11.2.3. By End-User

12. MARKET DYNAMICS

12.1. Drivers

12.2. Challenges

13. MARKET TRENDS AND DEVELOPMENTS

14. COMPANY PROFILES

14.1. Caterpillar Inc

14.1.1. Business Overview

14.1.2. Key Revenue and Financials

14.1.3. Recent Developments

14.1.4. Key Personnel/Key Contact Person

14.1.5. Key Product/Online Training Offered

14.2. Cummins Inc

14.2.1. Business Overview

14.2.2. Key Revenue and Financials

14.2.3. Recent Developments

14.2.4. Key Personnel/Key Contact Person

14.2.5. Key Product/Online Training Offered

14.3. General Electric Company

14.3.1. Business Overview

14.3.2. Key Revenue and Financials

14.3.3. Recent Developments

14.3.4. Key Personnel/Key Contact Person

14.3.5. Key Product/Online Training Offered

14.4. KOHLER Co

14.4.1. Business Overview

14.4.2. Key Revenue and Financials

14.4.3. Recent Developments

14.4.4. Key Personnel/Key Contact Person

14.4.5. Key Product/Online Training Offered

14.5. Rolls-Royce Holdings plc

- 14.5.1. Business Overview
- 14.5.2. Key Revenue and Financials
- 14.5.3. Recent Developments
- 14.5.4. Key Personnel/Key Contact Person
- 14.5.5. Key Product/Online Training Offered
- 14.6. Atlas Copco Group
 - 14.6.1. Business Overview
 - 14.6.2. Key Revenue and Financials
 - 14.6.3. Recent Developments
 - 14.6.4. Key Personnel/Key Contact Person
 - 14.6.5. Key Product/Online Training Offered
- 14.7. Himoinsa SL
 - 14.7.1. Business Overview
 - 14.7.2. Key Revenue and Financials
 - 14.7.3. Recent Developments
 - 14.7.4. Key Personnel/Key Contact Person
 - 14.7.5. Key Product/Online Training Offered
- 14.8. Doosan Bobcat Inc
 - 14.8.1. Business Overview
 - 14.8.2. Key Revenue and Financials
 - 14.8.3. Recent Developments
 - 14.8.4. Key Personnel/Key Contact Person
 - 14.8.5. Key Product/Online Training Offered
- 14.9. PR Industrial S.r.l unipersonale
 - 14.9.1. Business Overview
 - 14.9.2. Key Revenue and Financials
 - 14.9.3. Recent Developments
 - 14.9.4. Key Personnel/Key Contact Person
 - 14.9.5. Key Product/Online Training Offered
- 14.10. Wartsila Corporation
 - 14.10.1. Business Overview
 - 14.10.2. Key Revenue and Financials
 - 14.10.3. Recent Developments
 - 14.10.4. Key Personnel/Key Contact Person
 - 14.10.5. Key Product/Online Training Offered

15. STRATEGIC RECOMMENDATIONS

16. ABOUT US & DISCLAIMER

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