Transformer Monitoring System Market worth $10.64 billion by 2030- Exclusive Report by 360iResearch
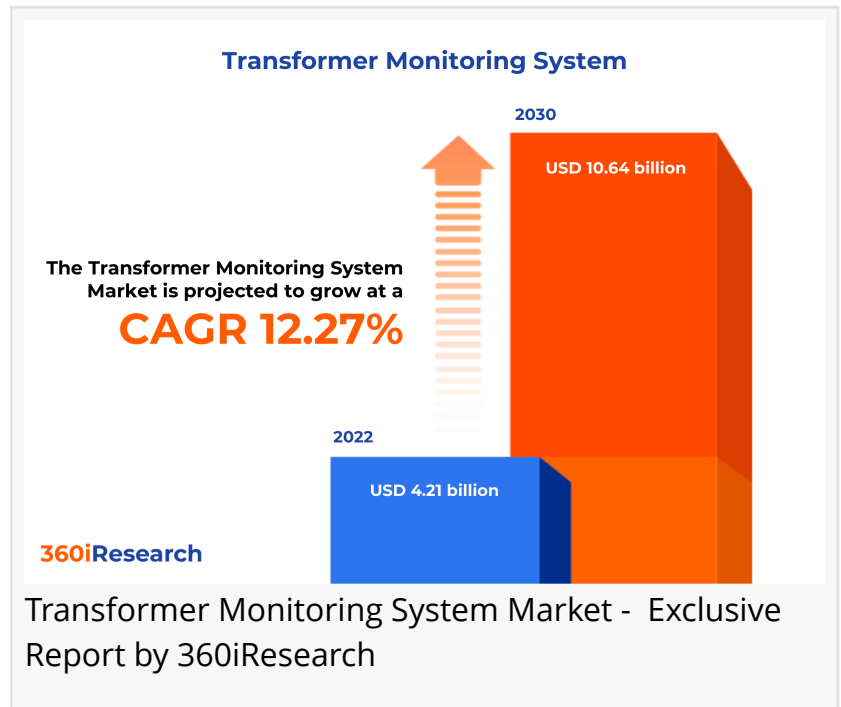
The Global Transformer Monitoring System Market to grow from USD 4.21 billion in 2022 to USD 10.64 billion by 2030, at a CAGR of 12.27%.

PUNE, MAHARASHTRA, INDIA , December 4, 2023 /EINPresswire.com/ -- The "Transformer Monitoring System Market by Type (Hardware Solutions, IT Solutions), Type of Transformer (Ground Transformer, Pole Mounted Transformer), Installation Type, Application, End-Use - Global Forecast 2023-2030" report has been added to 360iResearch.com's offering.

Transformer Monitoring System

2030
USD 10.64 billion

The Transformer Monitoring System Market is projected to grow at a
CAGR 12.27%

2022
USD 4.21 billion

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Transformer Monitoring System Market - Exclusive Report by 360iResearch

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A transformer monitoring system (TMS) is an integration of hardware and software components that work together to assess various critical parameters of the transformers in the power grid, including voltage, current, temperature, oil level, and gas concentrations. This information enables predictive maintenance and immediate fault detection, enhancing the reliability, efficiency, and lifespan of these pivotal assets in power distribution and transmission. Transformer monitoring systems find applications across various end-use sectors, such as power utilities, industrial and manufacturing, commercial establishments, and renewable power generation. They are instrumental in smart grid infrastructure, facilitating the integration of renewable energy sources and aiding in the modernization of the aging power infrastructure. An increase in demand for electricity, coupled with the need for efficient and reliable power

transmission, primarily drives market growth. However, high initial cost of deployment of a transformer monitoring system and concerns related to cybersecurity and data privacy impede product development activities. Companies are working on developing cost-effective systems with an improved focus on security to address these limitations. Market players are implementing AI and machine learning algorithms in transformer monitoring systems to improve predictive capabilities, reducing the chances of transformer failures. They are also working on the development of highly sensitive and accurate sensors capable of detecting even the minutest changes in transformer conditions.

Type: Adoption of various advanced hardware components for acquiring critical monitoring data

The hardware solutions for transformer monitoring systems encompass a range of robust and intelligent devices. These include sensors for temperature, gas, oil level, and partial discharge, which gather critical operational data. Protective relays that ensure operational safety and remote terminal units (RTU) that facilitate communication with control centers. These systems may also include smart circuit breakers and tap-changer position indicators that contribute to the regulation and maintenance of optimal transformer function. On the information technology front, transformer monitoring systems feature advanced software platforms that aggregate and analyze the data captured by the hardware sensors. This software typically includes data acquisition systems, condition monitoring, and diagnostic tools that help in predicting potential faults and managing asset performance. Moreover, IT infrastructure for secure data transmission, cloud storage services for data management, and user interface applications that provide real-time analytics and alerts to operators are also essential components of a comprehensive monitoring system.

End-Use: Power transformer works on government standardization and targets the monitoring, maintenance, and control of the transmission networks

Distribution transformers, vitally positioned within commercial and residential distribution networks, provide essential preemptive fault detection functionalities with advancements in IoT-enhanced analytics. Generator transformers serve as crucial intermediaries between power generation and the grid, necessitating fail-safe operational management, catered to by specialized diagnostic systems offering next-generation predictive maintenance platforms representing a significant innovation. High-voltage power transformers, integral for long-distance energy transfer, demand the utmost monitoring of intricacies of temperature and gas level parameters, usually for enhanced grid integration. In a comparative analysis, distribution transformers cater to end-consumer delivery and prioritize reliability and maintenance management. Generator transformers are positioned in power production settings, emphasizing asset protection and uptime. Power transformers focus on the broader scalability of power transmission and system integrity. Notably, the common thread across all segments is the universal trend towards a smarter grid with predictive maintenance capabilities facilitated by advancements in AI and IoT technologies.

Type of Transformer: Exponential adoption of TMS in ground transformers for optimizing

maintenance and maintaining safety

Ground transformers, commonly referred to as pad-mounted transformers, are electric power distribution transformers that are mounted on the ground and are designed to lower the voltage from utility lines to suitable levels for residential, commercial, or light industrial use. Ground transformers are designed with safety and reliability in mind, featuring built-in fusing and protection to minimize the risk of outages and electrical hazards. Pole-mounted transformers are elevated electrical transformers mounted on utility poles. They are designed to convert distribution voltage to lower voltage levels suitable for residential and commercial service. These transformers are located above ground level, which helps to protect them from certain types of hazards, such as flooding. Additionally, their elevated position allows for easier access for maintenance while minimizing their physical footprint on ground level. Pole-mounted transformers are a common sight in suburban and rural areas, where they distribute electrical power to smaller numbers of consumers spread over larger distances. Both these transformers require transformer monitoring systems to continuously monitor operational performance to predict and prevent failures that could lead to power outages or disruption of electricity supply.

Application: Extensive use of TMS in oil & gas monitoring for early detection of internal faults helps to enhance overall system reliability

Ensuring operational reliability, bushing monitoring service provides real-time analysis of bushing conditions, detecting abnormalities in capacitance and dissipation factors that may indicate degradation or potential failure. This proactive approach mitigates the risk of outages and extends the lifespan of bushings within the transformer system. Oil/gas monitoring service is critical for the health of transformer systems, as it involves the continuous surveillance of the dielectric oil's quality and the identification of dissolved gas levels. Whereas partial discharge (PD) monitoring is a vital service that diagnoses the early stages of insulation breakdown within electrical equipment. By detecting and locating PD activity, the crucial insights into the health of the transformer insulation systems, facilitating maintenance decisions that preempt catastrophic failures and extend equipment longevity. Temperature monitoring services are an essential component in transformer management, ensuring that operating temperatures remain within safe limits. By leveraging advanced thermal imaging and sensor technologies, tracking of temperature fluctuations, detecting hotspots, and providing alerts for potential overheating, safeguarding against thermal degradation and prolonging the life of transformers.

Regional Insights:

The Americas observes high implementation rates of transformer monitoring systems due to advanced power infrastructure and proactive measures for grid stability and transformer health. The region is home to several leading transformer monitoring systems manufacturers with extensive R&D capabilities, focusing on innovation and advanced functionalities. APAC observes rapidly increasing adoption owing to growing energy requirements and industrialization, with a particular focus on integrating renewable energy sources. The region follows a fast-growing market presence with large-scale international companies expanding and numerous regional companies driving innovation. Asia-Pacific observes rising production capacities, with China and India emerging as significant players due to cost advantages and increasing local expertise.

EMEA market growth is driven by the necessity to update aging power infrastructure and adhere to stringent energy regulations. A balanced mix of traditional manufacturers and new entrants, with a focus on developing reliable and energy-efficient transformer monitoring systems solutions. EMEA observes a strong presence of established companies, with steady competition from regional startups. The exponential industrial growth, energy demands, and the adoption of smart grid technologies elevate the demand for transformer monitoring systems.

FPNV Positioning Matrix:

The FPNV Positioning Matrix is essential for assessing the Transformer Monitoring System Market. It provides a comprehensive evaluation of vendors by examining key metrics within Business Strategy and Product Satisfaction, allowing users to make informed decisions based on their specific needs. This advanced analysis then organizes these vendors into four distinct quadrants, which represent varying levels of success: Forefront (F), Pathfinder (P), Niche (N), or Vital(V).

Market Share Analysis:

The Market Share Analysis offers an insightful look at the current state of vendors in the Transformer Monitoring System Market. By comparing vendor contributions to overall revenue, customer base, and other key metrics, we can give companies a greater understanding of their performance and what they are up against when competing for market share. The analysis also sheds light on just how competitive any given sector is about accumulation, fragmentation dominance, and amalgamation traits over the base year period studied.

Key Company Profiles:

The report delves into recent significant developments in the Transformer Monitoring System Market, highlighting leading vendors and their innovative profiles. These include ABB Ltd., Baker Hughes Company, Camlin Ltd., Eaton Corporation PLC., Emerson Electric Co., ESCO Technologies, General Electric Company, HIOTRON, Hitachi Limited, Honeywell International, Inc., Kirloskar Electric Company Limited, KJ Dynatech, Inc., KRYFS Power Components Ltd., M B Control & Systems Pvt Ltd., Maschinenfabrik Reinhausen GmbH., Megger Group Limited, MISTRAS Group, Mitsubishi Corporation, Mod Tronic Instruments Ltd., Motwane Manufacturing Company Pvt. Ltd., MTE Meter Test Equipment AG, Ningbo Ligong Online Monitoring Technology Co., Ltd., Qualitrol Company LLC, S&C Electric Company, Schneider Electric SE, Schweitzer Engineering Laboratories, Inc., Siemens AG, Vaisala Oyj, Wilson Transformer Company, and Wipro Limited.

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Market Segmentation & Coverage:

This research report categorizes the Transformer Monitoring System Market in order to forecast the revenues and analyze trends in each of following sub-markets:

Based on Type, market is studied across Hardware Solutions and IT Solutions. The Hardware Solutions is projected to witness significant market share during forecast period.

Based on Type of Transformer, market is studied across Ground Transformer and Pole Mounted Transformer. The Ground Transformer is projected to witness significant market share during forecast period.

Based on Installation Type, market is studied across New Installlation and Retrofit. The Retrofit is projected to witness significant market share during forecast period.

Based on Application, market is studied across Bushing Monitoring, Oil/Gas Monitoring, Partial Discharge Monitoring, and Temperature Monitoring. The Oil/Gas Monitoring is projected to witness significant market share during forecast period.

Based on End-Use, market is studied across Distribution Transformers, Generator Transformer, and Power Transformers. The Power Transformers is projected to witness significant market share during forecast period.

Based on Region, market is studied across Americas, Asia-Pacific, and Europe, Middle East & Africa. The Americas is further studied across Argentina, Brazil, Canada, Mexico, and United States. The United States is further studied across California, Florida, Illinois, New York, Ohio, Pennsylvania, and Texas. The Asia-Pacific is further studied across Australia, China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam. The Europe, Middle East & Africa is further studied across Denmark, Egypt, Finland, France, Germany, Israel, Italy, Netherlands, Nigeria, Norway, Poland, Qatar, Russia, Saudi Arabia, South Africa, Spain, Sweden, Switzerland, Turkey, United Arab Emirates, and United Kingdom. The Americas commanded largest market share of 41.64% in 2022, followed by Europe, Middle East & Africa.

Key Topics Covered:

1. Preface
2. Research Methodology
3. Executive Summary
4. Market Overview
5. Market Insights
6. Transformer Monitoring System Market, by Type
7. Transformer Monitoring System Market, by Type of Transformer
8. Transformer Monitoring System Market, by Installation Type
9. Transformer Monitoring System Market, by Application

10. Transformer Monitoring System Market, by End-Use
11. Americas Transformer Monitoring System Market
12. Asia-Pacific Transformer Monitoring System Market
13. Europe, Middle East & Africa Transformer Monitoring System Market
14. Competitive Landscape
15. Competitive Portfolio
16. Appendix

The report provides insights on the following pointers:
1. Market Penetration: Provides comprehensive information on the market offered by the key players
2. Market Development: Provides in-depth information about lucrative emerging markets and analyzes penetration across mature segments of the markets
3. Market Diversification: Provides detailed information about new product launches, untapped geographies, recent developments, and investments
4. Competitive Assessment & Intelligence: Provides an exhaustive assessment of market shares, strategies, products, certification, regulatory approvals, patent landscape, and manufacturing capabilities of the leading players
5. Product Development & Innovation: Provides intelligent insights on future technologies, R&D activities, and breakthrough product developments

The report answers questions such as:
1. What is the market size and forecast of the Transformer Monitoring System Market?
2. Which are the products/segments/applications/areas to invest in over the forecast period in the Transformer Monitoring System Market?
3. What is the competitive strategic window for opportunities in the Transformer Monitoring System Market?
4. What are the technology trends and regulatory frameworks in the Transformer Monitoring System Market?
5. What is the market share of the leading vendors in the Transformer Monitoring System Market?
6. What modes and strategic moves are considered suitable for entering the Transformer Monitoring System Market?

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