

# Smart Grid Market to Hit USD 400.2 Billion by 2035, Growing at 17.1% CAGR from USD 70.5 Billion in 2024 | TMR

*Smart Grid Market to hit US\$ 400.2 Bn by 2035, growing at 17.1% CAGR, fueled by digitalization, renewable integration, and rising energy efficiency demand.*

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-- The global energy industry is undergoing a rapid transformation as nations transition from conventional fossil-fuel-based electricity generation to cleaner, smarter, and more sustainable power systems. At the center of this transformation lies the

smart grid, a technology-driven electricity network that integrates advanced communication, automation, and control systems. Unlike traditional grids that transmit energy in a one-way direction—from producers to consumers—smart grids enable a two-way flow of energy and data, enhancing efficiency, flexibility, and reliability.

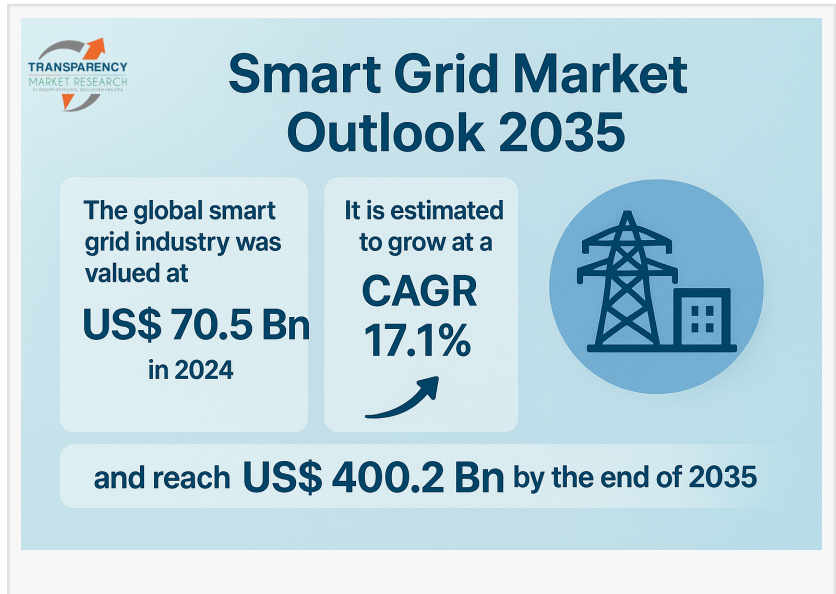
According to industry estimates, the global [smart grid market](#) was valued at US\$ 70.5 billion in 2024. It is projected to grow at a CAGR of 17.1% between 2025 and 2035, reaching an impressive US\$ 400.2 billion by the end of 2035. This growth is underpinned by rising global electricity demand, increasing integration of renewable energy sources such as solar and wind, and large-scale investments in grid modernization.

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Analysts' Viewpoint on the Smart Grid Market Scenario

Industry analysts point to several key trends driving smart grid adoption:



Integration of renewable energy sources into national and regional grids, ensuring stability despite intermittency.

Modernization of aging power infrastructure, which is increasingly inadequate to meet rising electricity demand.

Deployment of advanced distribution and metering systems to improve asset utilization, reduce outages, and cut operational costs.

Government support and regulatory initiatives, particularly in North America, Europe, and Asia-Pacific, which are accelerating adoption through subsidies and investment programs.

Utilities worldwide are turning to smart grids to optimize electricity flow, improve demand-side management, and build resilience against outages. For consumers, smart grid adoption translates into improved energy reliability, dynamic pricing models, and greater engagement in energy efficiency practices.

## Global Smart Grid Market Overview

A smart grid can be defined as a modernized power system that leverages digital communication technologies, sensors, and IoT-based platforms to monitor, control, and optimize electricity generation, transmission, and distribution. Unlike conventional electricity networks, smart grids allow for:

Two-way communication between consumers and utilities.

Integration of decentralized renewable energy sources such as solar rooftops, wind farms, and hydropower.

Predictive maintenance and self-healing capabilities, reducing downtime and operational risks.

Enhanced energy efficiency through real-time monitoring and demand-response systems.

The share of renewables in global electricity generation reached 13.4% in 2023 at 3935 TWh, led by solar and wind. The intermittency of renewables underscores the importance of flexible and adaptive smart grids capable of balancing supply and demand.

## Key Market Drivers

### Growing Integration of Renewable Energy Sources

The rapid expansion of renewable energy capacity is one of the strongest growth drivers for the smart grid market. According to the U.S. Energy Information Administration, renewables accounted for 22% of electricity generation in 2023, expected to rise to nearly 25% by 2025.

However, renewables introduce significant variability, as solar and wind outputs depend on weather conditions. Smart grids enable real-time monitoring, predictive analysis, and automated demand response to balance power flows and maintain grid stability.

In India, the Green Energy Corridor project is designed to integrate 20 GW of renewable capacity into the national grid using smart grid technologies.

China continues to invest in ultra-high-voltage (UHV) smart transmission projects, ensuring renewable power integration at scale.

Europe is spearheading renewable integration through strong policies, aligning with its net-zero 2050 targets.

The role of smart grids in ensuring seamless renewable integration is crucial for nations to achieve sustainability goals.

## Rising Electricity Demand and Grid Modernization Needs

Global electricity demand rose 2.2% in 2023 and is expected to increase by nearly 50% by 2040, driven by population growth, industrialization, and electrification of transport and heating.

Traditional electricity grids, many of which are decades old, face challenges such as inefficiency, frequent outages, and inability to handle distributed energy resources. Smart grids provide self-healing networks, predictive maintenance, and flexible digital monitoring, enabling utilities to cope with growing demand.

In the U.S., the Department of Energy (DOE) estimates that power outages cost businesses over US\$ 150 billion annually. Smart grids can mitigate these losses by reducing unplanned outages. China has allocated nearly US\$ 100 billion between 2021 and 2025 for grid modernization, including smart transmission projects.

Brazil has witnessed a 5% rise in electricity demand in 2023, leading to heavy investment in smart metering and distribution systems.

Thus, modernization of power infrastructure is both an economic and operational imperative.

## Market Segmentation Insights

### Distribution – The Prominent Application Segment

Distribution networks are emerging as the largest revenue-generating application in the smart grid market.

Smart meters, advanced distribution management systems (ADMS), and automated fault detection technologies are being rapidly deployed.

India aims to install 250 million smart meters by 2030 under its Smart Meter National Program (SMNP).

China targets 90% automation of urban distribution networks by 2030 through the State Grid Corporation of China.

The growing demand for rooftop solar, electric vehicle charging infrastructure, and DERs further boosts the need for advanced distribution integration.

## Regional Insights

### North America – Leading the Global Market

North America is the leading regional market, driven by:

Massive U.S. investments in grid modernization.

Regulatory support through the Smart Grid Investment Grant Program, which deployed over 15 million smart meters.

Utilities such as Pacific Gas and Electric (PG&E) and Duke Energy adopting advanced smart grid technologies.

### Asia Pacific – Fastest-Growing Market

Asia Pacific is witnessing rapid adoption, particularly in China, Japan, and India:

China invested US\$ 77 billion in smart distribution networks in 2023.

Japan's TEPCO has installed 30+ million smart meters, targeting nationwide rollout by 2025.

India's push for 250 million smart meters by 2030 highlights its commitment to digitizing grid infrastructure.

### Europe – Strong Policy-Driven Adoption

Europe's growth is supported by EU renewable energy directives and aggressive carbon reduction targets. Investments in digital substations, demand response platforms, and AI-driven grid monitoring are strengthening regional adoption.

## Competitive Landscape

The smart grid market is highly competitive, with global and regional players focusing on R&D, digital solutions, and renewable integration.

Key Players Include:

Mitsubishi Heavy Industries, Ltd. – Leading in Japan's national smart grid initiatives, including AI-driven power management.

Enel Green Power (Italy) – Major player in Europe and Latin America with extensive smart meter deployment and digital substation investments.

Ormat Technologies – Expanding geothermal and renewable integration with smart infrastructure.

Toshiba Energy Systems & Solutions Corporation – Providing advanced grid automation solutions.

Berkshire Hathaway Energy, Calpine Corporation, Northern California Power Agency, NV Energy

Inc., Sumitomo Corporation – Expanding smart grid investments across North America and Asia.

Competition is centered on grid automation, DER management, AI-driven analytics, and smart metering solutions.

## Recent Developments

2024: Ormat Technologies acquired a renewable asset portfolio worth US\$ 271 million from Enel Green Power North America, enhancing its grid integration and stability.

2023: Mitsubishi Heavy Industries launched its TOMONI® AI-driven platform, offering predictive control and real-time monitoring for smart power plants.

Ongoing: National programs in India, China, and Europe continue to accelerate large-scale smart meter and ADMS deployments.

The smart grid market is on track to expand more than fivefold by 2035, propelled by rising electricity demand, renewable energy integration, and widespread infrastructure modernization. With North America leading adoption, Asia Pacific showing the fastest growth, and Europe enforcing policy-driven transformation, the global landscape reflects a collective push toward digital, resilient, and sustainable energy systems.

For governments, utilities, and technology providers, the smart grid revolution represents both a challenge and an opportunity—balancing investment costs with long-term gains in reliability, efficiency, and sustainability. As adoption scales, smart grids will be a cornerstone of the global energy transition, enabling nations to meet climate goals while ensuring reliable power delivery to growing populations.

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