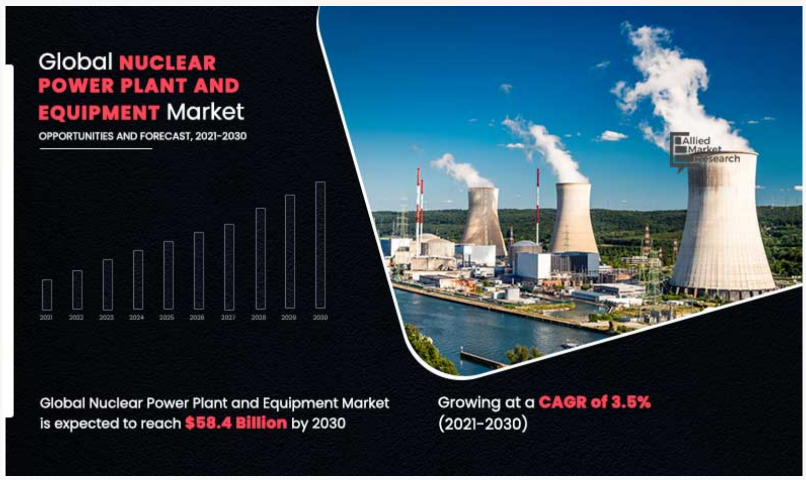
Clean Energy Transition Drives Nuclear Power Plant and Equipment Market Toward $58.4 Billion by 2030

Rising Demand for Low-Carbon Energy Boosts Growth of the Global Nuclear Power Plant and Equipment Market



WILMINGTON, DE, UNITED STATES, October 17, 2025 /EINPresswire.com/ --

According to a recent report by Allied Market Research, the global nuclear power plant and equipment market size was valued at $41.1 billion in 2020 and is projected to reach $58.4 billion by 2030, registering a CAGR of 3.5% from 2021 to 2030.

The growing global need for low-carbon-emission energy and sustainable long-life power generation systems has significantly boosted the demand for nuclear energy infrastructure and supporting equipment. Nuclear power remains a reliable and efficient source of electricity, contributing nearly 15% of the world's total electricity generation.

> Global nuclear power plant and equipment market to hit $58.4B by 2030, fueled by low-carbon energy demand and long-life plant projects. □□□□"
>
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□□ Role of Nuclear Power in the Global Energy Mix

Nuclear power plants differ from traditional fossil-fuel plants mainly in the source of heat used to generate electricity. Instead of burning coal, oil, or gas, nuclear reactors rely on nuclear fission (and in future, fusion technology) to produce heat for converting water into steam that drives turbines.

Unlike fossil fuels, nuclear energy produces negligible carbon emissions, making it a vital component in achieving global net-zero energy goals. The U.S. Energy Information Administration (EIA) reported that, as of December 2020, the U.S. operated 94 nuclear reactors across 56 power plants, contributing nearly 20% of the nation’s electricity.

Nuclear plants require materials with high thermal conductivity, radiation resistance, and low neutron absorption. The equipment used in these reactors must withstand extreme radiation, pressure, and temperature, underscoring the importance of advanced nuclear equipment and engineering innovations.

□ Market Dynamics: Growth Drivers and Challenges

The expanding demand for carbon-free electricity is one of the primary growth drivers of the nuclear power plant and equipment market. Countries around the world are revisiting their nuclear strategies to meet rising electricity demand while cutting emissions.

Additionally, technological advancements in reactor designs—such as small modular reactors (SMRs) and next-generation reactors—are creating new growth opportunities for equipment manufacturers. These modern reactors are safer, more efficient, and easier to deploy.

However, challenges remain. High capital investment, stringent regulatory approvals, and public perception issues related to nuclear safety continue to affect market expansion. Despite this, the drive for energy security and climate-neutral power is expected to sustain long-term market growth.

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□□ Market Segmentation Insights

By Reactor Type: The pressurized water reactor (PWR) segment dominated the market in 2020 and is projected to maintain its lead through 2030. PWRs are widely preferred due to their operational safety, efficiency, and mature technology base. Other reactor types include pressurized heavy water reactors (PHWRs), boiling water reactors (BWRs), light water graphite reactors (LWGRs), and gas-cooled reactors (GCRs).

By Equipment Type: The auxiliary equipment segment held the largest share in 2020 and is anticipated to continue leading during the forecast period. Auxiliary systems include cooling mechanisms, pressure vessels, turbines, and control systems, all essential for maintaining plant safety and performance.

By Region: The Asia-Pacific region emerged as the largest market in 2020 and is projected to maintain its dominance through 2030. Nations such as China, India, and Japan are heavily investing in nuclear energy expansion to meet rising power demands and carbon neutrality targets. Government initiatives and infrastructure investments are propelling regional growth.

 Key Industry Players

Major companies shaping the nuclear power plant and equipment market include:

BWX Technologies, Inc.

Doosan Corporation

General Electric

Mitsubishi Heavy Industries, Ltd.

Korea Electric Power Corporation (KEPCO)

Larsen & Toubro Limited

Dongfang Electric Co., Ltd.

Shanghai ALSTOM SA

The State Atomic Energy Corporation (ROSATOM)

Toshiba International Corporation

These key players focus on technological innovation, strategic collaborations, and capacity expansion to strengthen their global presence and meet the increasing demand for nuclear components.

 Impact of COVID-19 on the Nuclear Sector

The COVID-19 pandemic significantly disrupted global industrial operations, including the nuclear energy sector. Supply chain interruptions, reduced workforce availability, and project delays affected the market's short-term growth.

Reactor construction projects in China, France, the U.S., and the UAE faced temporary halts due to workforce restrictions and logistical barriers. Furthermore, the global uranium supply chain was affected as several mines and processing facilities suspended operations, driving a 33% spike in uranium prices during early 2020.

While electricity demand dipped across several countries, the nuclear industry demonstrated resilience. No enforced shutdowns of nuclear power reactors were reported, thanks to strict safety and operational measures. The International Atomic Energy Agency (IAEA) confirmed that the nuclear sector adapted swiftly to pandemic conditions, ensuring uninterrupted energy supply.

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□ Future Outlook

The global nuclear power plant and equipment market is poised for a stable growth trajectory through 2030, driven by rising investments in clean energy infrastructure and the revival of nuclear expansion projects.

As governments emphasize decarbonization and long-term energy stability, nuclear power remains a cornerstone of sustainable electricity generation. The integration of digital control systems, modular designs, and advanced materials will further enhance safety, efficiency, and scalability.

By 2030, nuclear power will continue to play a critical role in bridging the global energy transition, supporting industrial growth, and contributing to a low-carbon future. □□□

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