

# Small Modular Reactor Market by Reactor (HWR, LWR, HTR, FNR, MSR), Application (Power Generation, Desalination, Hydrogen Generation, Industrial), Deployment (Single, Multi), Connectivity, Location, Coolant, Power Rating & Region - Global Forecast to 2030

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### **Report description:**

The global small modular reactor market is estimated to grow from USD 6.8 billion by 2030 from an estimated of USD 5.8 billion in 2023; it is expected to record a CAGR of 2.3% during the forecast period. Increased investment in industrial production is driving the demand of small modular reactor market. According to the International Energy Agency, nuclear energy accounted for ~10% of the global electricity generation mix in 2021. Asia Pacific, along with Europe and the Americas, provide lucrative opportunities for the deployment of SMRs owing to their small size, which enables siting feasibility in remote regions, isolated grids, islands, and small-scale grids. The governments of the US, the UK, and Canada have undertaken various policy initiatives to accelerate the development and commercialization of SMR technology.

"101-200 MW: The second largest- growing segment of the Small modular reactor market"

Based on by power rating of small modular reactor, the 101-200 MW segment is estimated to be the second largest-growing market from 2023 to 2028. The power rating of 101-200 MW holds a market share of 29.3% share of the small modular reactor market in 2022. In addition to power generation, small modular reactors (SMRs) in the range of 101 to 200 MW can indeed be actively used in the field of desalination. Desalination is the process of converting seawater or brackish water into freshwater suitable for various purposes, including drinking water, agriculture, and industrial applications. SMRs can play a significant role in this domain by providing the necessary energy for desalination plants. The excess heat generated by the reactor can be utilized in thermal desalination methods such as multi-effect distillation (MED) or multi-stage flash (MSF) distillation. In these processes, the heat is used to evaporate seawater, leaving behind salt and impurities, and then condensing the vapor to produce freshwater. "Molten Salt: The third largest- growing segment of the Small modular reactor market"

Based on by coolant of small modular reactor, the Molten Salt segment is estimated to be the third largest-growing market from 2023 to 2028. The salts concerned as primary coolants are mostly lithium-beryllium fluoride, and lithium fluoride. Molten Salt Reactors (MSRs) use molten fluoride salts as the primary coolant. Fluoride salts have very low vapor pressures even at high temperatures due to their good heat transfer properties. They are not damaged by radiation, do not react violently with air or water, and are inert to some common structural metals. Using Molten salts as a coolant in the reactor will make them radioactive and can lead to the need for periodic maintenance. But the operational advantages of these salts are far more preferred than the disadvantages fueling the market for molten salts segment. MSRs have the flexibility to utilize various fuels, including uranium, plutonium, actinides derived from nuclear waste, and thorium. The choice of fuel depends on whether the MSRs are operating as fast reactors or not. One notable advantage of MSRs is their ability to operate at high temperatures, making them suitable for generating hydrogen and providing heat for diverse industrial applications.

"Desalination: The third-largest segment by application in Small modular reactor market"

The desalination segment, by applications, is projected to hold the third-largest market size during the forecast period. SMRs can be used for nuclear desalination, where potable water is produced from seawater in a facility. Desalination using an SMR may involve the use of electrical or thermal energy. The distillation process may require mainly heat, in addition to electricity for ancillary equipment, and the membrane process, which requires only electricity to provide pumping power. Desalination plants may also be designed to produce potable water or used as co-generation nuclear power plants to generate electricity. Currently, the energy for desalination plants is mostly produced from fossil fuels, which causes several environmental concerns. Therefore, several countries are considering using SMRs for desalination. SMRs that generate low-temperature heat (280-325?C) are a viable option to fulfill the increasing demand for potable water, especially in areas with acute water shortages in several arid and semi-arid zones. Geographies such as Asia, the Middle East, and North Africa have immense potential for the deployment of SMRs for desalination. Harnessing the advantages of SMRs for desalination can enhance water security, promote sustainable development, and alleviate the strain on freshwater sources in a more environmentally friendly manner.

"Americas: The third fastest and third largest-growing region in Small modular reactor market"

Americas is estimated to hold the third largest and third fastest market share in the small modular reactor market. The scope of this regional market includes the US, Canada, and Argentina. The region houses some of the major SMR developers such as NuScale Power, LLC. (US), GE Hitachi Nuclear Energy (US), Moltex Energy (Canada), and Terrestrial Energy Inc. (Canada), which has helped the Americas in developing multiple SMR projects that are expected to be commercialized in the near future. According to the BP Statistical Review of World Energy 2021, the electricity generated from nuclear power accounted for 18.5% of the total electricity generation in the region.

The governments in this region have made several advancements in the development of SMRs. For instance, the US Department of Energy selected 13 projects in April 2018 to receive USD 60 million in cost-shared R&D funding for advanced SMR technologies as a part of grants under the US Industry Opportunities for Advance Nuclear Technology Development initiative. The Department of Energy also established the Advanced Reactor Demonstration Program (ARDP) in May 2020 to provide funds (starting with USD 160 million) on a cost-sharing basis for the construction of two SMRs that are expected to become operational within seven years. Similarly, as a part of the initiatives by the Canadian government, Terrestrial Energy Inc. (Canada) received a grant of USD 14.9 million investment from Canada's Strategic Innovation Fund to accelerate the development of its Integral Molten Salt Reactor (IMSR) in October 2020.

### 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- 35%, Tier 2- 45%, and Tier 3- 20%

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

By Region: Americas- 40%, Asia Pacific- 35%, Europe- 20%, and the Middle East & Africa- 5%

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: < USD 500 million

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The Small modular reactor market is dominated by a few major players that have a wide regional presence. The leading players in the Small modular reactor market are Westinghouse Electric Company LLC (US), NuScale Power, LLC. (US), Terrestrial Energy Inc. (Canada), Moltex Energy (Canada), GE Hitachi Nuclear Energy (US), X Energy, LLC. (US), X Energy, LLC. (US), General Atomics (US), ARC Clean Energy, Inc. (Canada), LeadCold Reactors (Sweden), Rolls-Royce (UK), Ultra Safe Nuclear (US), Toshiba Energy Systems & Solutions Corporation (Japan), Tokamak Energy Ltd. (UK), SNC-Lavalin Group (Canada), Afrikantov OKB Mechanical Engineering (Russia), China National Nuclear Corporation (China), Framatome (France), U-BATTERY (UK), and Seaborg Technologies (Denmark).

#### Research Coverage:

The report defines, describes, and forecasts the global Small modular reactor market, by reactor, deployment, connectivity, location, coolant, application, power rating, 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 Small modular reactor market.

### Key Benefits of Buying the Report

The report will help the leaders/new entrants in this market with information on the closest approximations of the revenue numbers for the overall market and the sub-segments. This report will help stakeholders understand the competitive landscape and gain more insights to better position their businesses and plan suitable go-to-market strategies. The report also helps stakeholders understand the pulse of the small modular reactor market and provides them information on key market drivers, restraints, challenges, and opportunities.

?[Analysis of key drivers (versatile nature of nuclear energy, Benefits of modularization and factory construction), restraints (Stringent regulatory policies and standards to deploy SMRs, Negative public perception of nuclear power technology), opportunities (Progression into sustainable future with net zero emission and decarbonization of energy sector, Integration of SMRs with renewable energy sources), and challenges (Lack of standard licensing process ) influencing the growth of the small modular reactor market.

?[Product Development/ Innovation: The future of the small modular reactor market looks bright. Terrestrial Energy Inc. signed an agreement with the Australian Nuclear Science and Technology Organisation (ANSTO). Under this agreement, ANSTO will provide technical guidance to Terrestrial Energy Inc. for the conditioning of used reactor fuel from the Integral Molten Salt Reactor (IMSR) power plants in the United States, Canada, and the United Kingdom, and other global markets.

?[Market Development: The versatile nature of nuclear energy could enable the transition to a cleaner world and a stronger global economy. In recent decades, clean energy sources have witnessed rapid innovations and cost reductions. Solar photovoltaic, wind power, hydropower, dispatchable geothermal (both deep and shallow), biomass, and concentrating solar power have experienced rapid technological and economic advances in the last decade. Nuclear energy has the potential to be coupled with several other energy sources in a synergistic fashion, which could result in integrated systems that are more than the sum of their parts.
?[Market Diversification: Westinghouse Electric Company LLC offers small modular reactors such as integral pressurized-water reactors and microreactors. The company expects to have its integral pressurized-water reactors ready for deployment in the US by the end of 2022. It intends on building a demonstration unit of its microreactor design by 2022 and deploying it for commercial operation by 2025. It also focuses on investments and expansion as one of its key strategies to increase market presence.
?[Competitive Assessment: In-depth assessment of market shares, growth strategies, and service offerings of leading players like Westinghouse Electric Company LLC. (US), Terrestrial Energy Inc. (Canada), Moltex Energy (Canada), and.GE Hitachi Nuclear Energy (US), among others in the small modular reactor market

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# Small Modular Reactor Market by Reactor (HWR, LWR, HTR, FNR, MSR), Application (Power Generation, Desalination, Hydrogen Generation, Industrial), Deployment (Single, Multi), Connectivity, Location, Coolant, Power Rating & Region - Global Forecast to 2030

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