

Cryogenic Fuels Market to exceed USD 195.08B by 2032, driven by space exploration and clean energy demand

"Expanding Demand for Clean Energy and Space Exploration Fuels Growth in Cryogenic Fuels Market, Boosting Innovation in Storage and Transportation Technologies"

AUSTIN, TX, UNITED STATES, October 28, 2024 /EINPresswire.com/ -- The Cryogenic Fuels Market is witnessing robust growth, driven by increasing demand for cleaner, energy-efficient fuels in various industries such as aerospace, defense, and power generation.



"According to the new market research report, The <u>Cryogenic Fuels Market size</u> was valued at USD 112.57 billion in 2023 and is expected to reach USD 195.08 billion by 2032, growing at a CAGR of 6.30% during the forecast period of 2024-2032."

Rising Demand for Cryogenic Fuels: Innovations in Technology and Strategic Investments Propel Market Growth

Demand for cryogenic fuels is bound to rise. These industrial fuels are applied in diverse applications requiring efficient and low-temperature fuels. Clean energy-efficient products like LNG and liquid hydrogen play a very significant role in most industries like aerospace, defense, and power generation. Important in applications such as space missions and rocket launches, these fuels have changed fuel storage and transfer technology. One of the examples here includes NASA's work on low-leakage cryogenic disconnects, through which fuel can be transferred both efficiently and securely.

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Key Players:

☐ Air Liquide (Cryocap, Nexelia)
☐ Air Products & Chemicals (Liquefied Natural Gas (LNG) Equipment, Hydrogen Liquefaction
Systems)
☐ Air Water, Inc. (Cryogenic Storage Tanks, Liquid Hydrogen)
☐ Chart Industries, Inc. (Brazed Aluminum Heat Exchangers, Cryogenic Storage Systems)
☐ Gulf Cryo (Liquid Nitrogen, Liquid Argon)
☐ Iwatani Corporation (Hydrogen Refueling Stations, Cryogenic Equipment)
☐ Linde Plc (Praxair Technology, Inc.) (LNG Solutions, Hydrogen Refueling Systems)
☐ Maine Oxy (Cryogenic Gases, Welding Gases)
☐ Messer Group GmbH (Cryogenic Supply Systems, Liquid Oxygen)
☐ Mitsubishi Chemical Holdings (Taiyo Nippon Sanso) (Hydrogen Generators, Cryogenic Pumps)
☐ Narco Inc. (Cryogenic Tanks, Liquid Oxygen)
☐ Nikkiso Co., Ltd. (Cryogenic Pumps, Vaporizers)
☐ SOL Group (Cryogenic Tanks, Liquid Nitrogen)
☐ Shell Global (LNG, Hydrogen Fuel)
☐ TechnipFMC (LNG Liquefaction Plants, Cryogenic Equipment)
☐ The Hydrogen Company (Electrolyzers, Hydrogen Storage Systems)
☐ TNSC (Taiyo Nippon Sanso) (Hydrogen Refueling Stations, Cryogenic Storage Systems)
☐ TotalEnergies (LNG, Hydrogen Solutions)
☐ WestAir Gases & Equipment, Inc. (Cryogenic Liquids, Industrial Gases)
☐ Woodside Energy (LNG, Hydrogen Solutions)

Another imperative factor that drives innovation is the partnership between universities and companies. As a case in point, Cal Poly is collaborating with Boeing to enhance its capabilities in cryogenic propulsion systems to improve storage and transfer efficiency in fuels; this is also crucial in space use. The innovations garnered within the cryogenic fuels market ensure a long-term growth trajectory wherein cryogenic fuels are some of the irreplaceable drivers within future space exploration, defense operations, and clean energy transitions.

Investments in Space Exploration and Hydrogen Technologies Drive Rapid Growth in Cryogenic Fuels Market

Investments in space exploration and aerospace by both the government and the private sector drive the cryogenic fuels market. With an uptick in satellite launches and deep-space missions, high-performance cryogenic fuels like liquid hydrogen and LNG for energy density and ultra-low temperatures are in high demand. Companies like SpaceX and NASA are leaders in technological development in this field.

Opportunities in Hydrogen-Based Technologies. The cryogenic fuels market is poised to have highly significant opportunities for the research and development of hydrogen-based technologies. These include applications in fuel cells, storage of renewable energy, and zero-emission vehicles. Liquid hydrogen, possessing exceptionally high energy content with imperceptibly small environmental impact, will play a key role in this transition. Increased

investment in hydrogen infrastructure by governments and private sectors has been seen to benefit manufacturers of cryogenic fuel, with high demands in hydrogen storage, transport, and fuel cell technologies.

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Segment Analysis

Among the types, Liquefied Natural Gas (LNG) continued as the cryogenic fuels market leader at around 40% of the market share in 2023. LNG continues to hold its top position primarily due to its lower carbon emissions than fossil fuels. Second, LNG is used largely in power generation, transportation, and industries, and orders for LNG-powered ships have been increasing mainly in Europe and North America, while energy needs are also expanding rapidly in Asia-Pacific, making the current trends even more stringent for LNG's position.

Among end-users, the energy and power segment accounted for 38% share in the year 2023. Both these will be driving demand for LNG and liquid hydrogen, which are required for cleaner energy generation. With LNG substituting coal in gasified power plants and liquid hydrogen increasingly substituting conventional fuels for renewable energy storage, the energy and power sector continues to be the most prominent end-user for cryogenic fuels.

Key Segments:
By Type
☐ Liquid Nitrogen
☐ Liquid Air
🛮 Liquid Helium
☐ Liquid Neon
☐ Liquid Hydrogen
☐ Liquefied Natural Gas (LNG)
By Application
$\hfill\square$ Aerospace & Space Exploration
☐ Power Generation
☐ Automotive
☐ Marine
□ Others
Dy End Hea Industry
By End Use Industry
☐ Energy & Power
☐ Aerospace & Defense
☐ Transportation
☐ Healthcare
□ Others

Regional Analysis

North America dominated the share of the market in the market for cryogenic fuels through 2023, accounting for a 35% share. Continued development of infrastructure in areas of space exploration and production of energy, along with increasing consumption of Liquefied Natural Gas in power generation and transportation, have contributed to widespread expansion across the region. All these have constituted significant investments on the part of agencies like NASA and privately owned companies like SpaceX, which all have rocketed the demand for cryogenic fuels-liquid hydrogen and liquid oxygen for propulsion.

Asia-Pacific is considered the largest growth region for the cryogenic fuels market, with a projected CAGR of 7.5% in 2023. LNG demand is driven by the demand in China, India, and South Korea for LNG as a cleaner fuel alternative to power generation and transportation. The market's focus on renewable energy and hydrogen technology has been creating momentum as governments support the expansion of infrastructure and adopt new and different fuels. China's ambitious roadmap for hydrogen energy, and Japan's hydrogen fuel cell technology leadershipthese projects show the region indeed is serious about making a shift into cryogenic fuels for a sustainable future. Recent Developments

☐ In May 2024, the Indian Space Research Organisation (ISRO) created a semi-cryogenic engine with liquid oxygen and kerosene to boost satellite payload capacity. This technology saves money but enhances thrust and performance.

☐ In April 2023, Linde signed a green hydrogen supply agreement with Evonik in Singapore, designing and operating a nine-megawatt alkaline electrolyzer to generate green hydrogen for Evonik's animal feed production processes.

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