+357 96 030922
info@marketpublishers.com

Large Hydro Power Plants Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Type (Run-Of-River, Pumped Storage Hydropower), By Application (Residential, Commercial, Industrial), By Component (Electric Infrastructure, Electromechanical Equipment, Civil Works, Others), By Region, By Competition, 2018-2028

https://marketpublishers.com/r/LD19A9CD9AB3EN.html
Date: November 2023
Pages: 178
Price: US$ 4,500.00 (Single User License)
ID: LD19A9CD9AB3EN

Abstracts

Global Large Hydro Power Plants Market was valued at USD 8.08 billion in 2022 and is anticipated to project robust growth in the forecast period with a CAGR of 5.19% through 2028.

The Large Hydro Power Plants market refers to the sector within the energy industry focused on the development, construction, operation, and maintenance of hydroelectric power generation facilities of substantial scale and capacity. These power plants typically harness the kinetic energy of flowing water, often by constructing dams or reservoirs to create a controlled flow of water that drives turbines, ultimately producing electricity on a significant scale.

Large hydro power plants are characterized by their capacity to generate a substantial amount of electrical energy, often exceeding 30 megawatts (MW), making them a vital component of a country's energy infrastructure. They play a crucial role in providing reliable, clean, and renewable energy to meet the growing global demand for electricity. These facilities contribute to energy security, grid stability, and the reduction of greenhouse gas emissions.

The Large Hydro Power Plants market encompasses various stakeholders, including

+357 96 030922
info@marketpublishers.com

government agencies, private investors, engineering firms, equipment manufacturers, and utility companies. It involves complex project planning, environmental assessments, and significant capital investments. The market's dynamics are influenced by factors such as regulatory policies, environmental considerations, technological advancements, and economic factors, making it a critical element in the global energy landscape.

Key Market Drivers

Energy Security and Reliability

Large hydroelectric power plants play a crucial role in ensuring energy security and reliability on a global scale. As countries strive to meet their growing energy demands, especially in the face of climate change and volatile fossil fuel prices, hydroelectric power remains a dependable and consistent source of electricity.

One of the key drivers for the continued development of large hydro power plants is their capacity to provide a stable and reliable source of electricity. Unlike some renewable energy sources, such as wind and solar, which are intermittent and subject to weather conditions, hydroelectric power generation can be controlled and adjusted to match demand. This flexibility is particularly important for balancing the grid and ensuring a consistent power supply, making it an essential component of any energy portfolio.

Moreover, large hydro power plants act as a valuable source of baseload power, meaning they can generate electricity around the clock, year-round. This characteristic makes them indispensable for meeting the basic energy needs of communities and industries, reducing the risk of blackouts or energy shortages.

Energy security is also closely linked to national sovereignty. By harnessing the power of their rivers and water resources, countries can reduce their dependence on imported fossil fuels, increasing their energy independence. This, in turn, can enhance national security by reducing vulnerability to energy supply disruptions or price fluctuations in global oil and gas markets.

Renewable Energy Transition and Climate Change Mitigation

The global transition to renewable energy sources is driven by the urgent need to mitigate climate change and reduce greenhouse gas emissions. Large hydro power

+357 96 030922
info@marketpublishers.com

plants are a vital component of this transition. They produce electricity without emitting greenhouse gases or other harmful pollutants, making them a clean and sustainable energy source.

In the fight against climate change, hydroelectric power is often seen as a low-carbon alternative to fossil fuels, helping countries reduce their carbon footprint. As governments and organizations worldwide commit to ambitious climate goals, large hydro projects are being expanded and developed to meet growing demand for clean energy.

Additionally, large hydro power plants provide an opportunity to store energy through pumped-storage hydroelectricity, helping to stabilize the grid by balancing supply and demand. This ability to store surplus energy during periods of low demand and release it during peak times enhances the reliability and integration of other intermittent renewable sources like wind and solar.

Economic Development and Job Creation

The construction and operation of large hydro power plants have significant economic implications. These projects often require substantial investments in infrastructure, including dams, turbines, and transmission lines, which stimulate economic growth in the regions where they are built.

The development of large hydro projects generates jobs in various sectors, from engineering and construction to maintenance and administration. Local communities benefit from increased employment opportunities, improved infrastructure, and increased tax revenue. This can lead to higher living standards and a reduction in poverty rates in the areas surrounding these power plants.

Moreover, large hydro projects can contribute to a country's export potential. Many countries with abundant water resources leverage their expertise in hydroelectric technology to export equipment and know-how to other nations seeking to develop their own hydroelectric capacity. This fosters international trade and cooperation while boosting the domestic economy.

Energy Access and Rural Electrification

Access to electricity is a fundamental driver of economic and social development. Large hydro power plants play a crucial role in expanding energy access and rural

+357 96 030922
info@marketpublishers.com

electrification in developing countries, where millions still lack access to reliable electricity.

These projects can deliver electricity to remote and underserved areas, helping bridge the energy access gap and improving the quality of life for millions of people. Rural electrification through large hydro power plants enables the electrification of homes, schools, healthcare facilities, and businesses, creating opportunities for education, healthcare, and economic development.

Furthermore, the availability of electricity can reduce reliance on traditional biomass fuels, such as wood and animal dung, for cooking and heating. This not only reduces indoor air pollution and associated health issues but also contributes to environmental conservation by decreasing deforestation and habitat degradation.

Water Resource Management and Irrigation

Large hydro power plants are often integrated with water resource management and irrigation systems, making them a multi-purpose infrastructure investment. These projects can help regulate water flows, prevent floods, and ensure a stable water supply for agriculture, which is critical for food security.

Hydropower reservoirs can act as water storage facilities, allowing countries to manage their water resources more effectively, particularly in regions prone to droughts and water scarcity. This dual-use approach maximizes the benefits of large hydro projects by addressing multiple societal needs simultaneously.

Irrigation systems powered by hydroelectricity increase agricultural productivity, support rural livelihoods, and contribute to food self-sufficiency. By efficiently utilizing water resources, large hydro power plants enhance water security and agricultural sustainability.

Technological Advancements and Innovation

Technological advancements and innovation are driving the global expansion and improvement of large hydro power plants. As countries seek to optimize the efficiency, environmental sustainability, and cost-effectiveness of their hydroelectric facilities, ongoing research and development efforts are crucial.

One of the significant innovations in the hydroelectric sector is the improvement of

+357 96 030922
info@marketpublishers.com

turbine design and efficiency. Modern turbines are more reliable and capable of generating power with minimal environmental impact. Additionally, the development of fish-friendly turbines and fish passage solutions aims to mitigate the ecological impacts of dams on aquatic ecosystems.

Advancements in materials, such as the use of advanced composites and concrete technology, have led to the construction of safer and more resilient dams and infrastructure. Remote monitoring and control systems have also been integrated to enhance the operational efficiency and safety of large hydro power plants.

In conclusion, large hydro power plants are driven by a complex interplay of factors, including energy security, climate change mitigation, economic development, energy access, water resource management, and technological innovation. These drivers underscore the critical role that large hydroelectric projects play in addressing a range of global challenges and shaping the future of sustainable energy generation.

Government Policies are Likely to Propel the Market

Renewable Energy Targets and Incentives

Governments worldwide are increasingly recognizing the importance of transitioning to renewable energy sources to mitigate climate change and ensure energy security. One of the key policies supporting large hydro power plants is the establishment of renewable energy targets and associated incentives.

Renewable energy targets are specific goals set by governments to increase the share of renewable energy in their energy mix. These targets are typically accompanied by a range of incentives, including subsidies, tax credits, and feed-in tariffs, to encourage the development and expansion of large hydroelectric projects.

Governments often provide financial incentives to attract private investments in large hydro power plants, making them more economically viable for developers. These incentives can help offset the high initial capital costs associated with dam construction and hydropower infrastructure.

Additionally, renewable energy certificates (RECs) and green power purchase programs allow utilities and consumers to buy renewable energy credits from large hydro projects, promoting the use of clean energy and stimulating further investment in the sector.

+357 96 030922
info@marketpublishers.com

These policies not only support the growth of large hydroelectric power but also contribute to reducing greenhouse gas emissions and advancing the global transition to a more sustainable energy landscape.

Environmental Regulations and Mitigation Measures

Large hydro power plants often have significant environmental impacts, including habitat disruption, water quality changes, and altered river flows. To address these concerns, governments around the world implement stringent environmental regulations and mitigation measures.

Environmental impact assessments (EIAs) are a crucial aspect of these policies. Developers of large hydro projects must conduct comprehensive assessments to evaluate the potential environmental and social impacts of their projects. These assessments help identify potential issues and inform the decision-making process.

Governments may require developers to implement mitigation measures to minimize the negative effects of large hydro power plants. These measures can include fish ladders and bypass channels to assist fish migration, water quality monitoring and management, and reservoir management plans to maintain healthy ecosystems in affected areas.

Furthermore, adherence to specific river flow regimes can be mandated to preserve downstream ecosystems and support aquatic life. These policies aim to strike a balance between harnessing the benefits of large hydroelectric power and safeguarding the environment.

Grid Integration and Infrastructure Investment

For large hydro power plants to contribute effectively to a country's energy mix, governments must implement policies that facilitate their integration into the national electrical grid. Grid integration policies encompass a range of measures designed to optimize the flow of electricity from large hydroelectric projects to end-users.

One essential policy is the development of transmission and distribution infrastructure to transport electricity generated by large hydro plants to urban centers and industries. Governments may invest in grid expansion, upgrading existing transmission lines, and establishing new substations to accommodate the increased electricity supply.

+357 96 030922
info@marketpublishers.com

Interconnection policies also play a critical role in grid integration. Governments may encourage the development of interconnection points between neighboring regions or countries, allowing for the exchange of electricity and enhancing grid stability.

To incentivize investment in grid infrastructure, governments may offer guarantees, subsidies, or financing options to utilities and private sector entities. These policies support the reliable delivery of large hydro power to consumers and contribute to the stability and resilience of the national energy grid.

Hydropower Development Incentives and Licensing

To promote the development of large hydro power plants, governments often provide incentives and licensing processes that streamline project approval and reduce regulatory barriers.

Licensing procedures can be complex and time-consuming due to the need for comprehensive environmental assessments and consultations with affected communities. Governments can expedite these processes by creating a clear and transparent regulatory framework that outlines the steps required for project approval.

In addition to regulatory streamlining, governments may offer financial incentives, such as grants, loans, or tax incentives, to attract private investors to large hydro projects. These incentives can help offset the substantial upfront costs associated with dam construction and hydropower infrastructure.

To ensure that hydropower development is sustainable and aligns with national energy goals, governments may establish specific criteria for project selection and licensing. These criteria may prioritize projects that have minimal environmental impacts, prioritize the use of existing infrastructure, or meet certain capacity thresholds.

Renewable Portfolio Standards and Offtake Agreements

Renewable portfolio standards (RPS) are policy mechanisms that require utilities to generate a specific percentage of their energy from renewable sources, including large hydro power plants. RPS policies are a crucial driver of renewable energy deployment and provide a stable market for large hydro projects.

Utilities must meet these RPS targets, which are typically set to increase gradually over time. To comply with these standards, utilities enter into power purchase agreements

+357 96 030922
info@marketpublishers.com

(PPAs) or offtake agreements with large hydro plant developers. These agreements guarantee a market for the electricity generated by large hydro projects, ensuring a return on investment for developers.

RPS policies provide long-term revenue certainty for large hydro projects, making them attractive to investors and developers. They also contribute to the diversification of the energy mix and the reduction of greenhouse gas emissions, aligning with broader sustainability goals.

International Cooperation and Funding

Many large hydro power projects require international cooperation and funding due to their scale and complexity. Governments often collaborate with international organizations and neighboring countries to facilitate the development of transboundary hydropower projects.

International funding mechanisms, such as multilateral development banks, provide financial support for large hydro projects in developing countries. These institutions offer loans, grants, and technical assistance to help countries implement sustainable and socially responsible hydropower projects.

Additionally, international agreements and treaties can govern the shared use of transboundary rivers and reservoirs, establishing principles for equitable water allocation and environmental protection. These agreements promote regional stability and cooperation while facilitating the development of large hydro power plants that benefit multiple nations.

In conclusion, government policies play a pivotal role in shaping the growth and sustainability of large hydro power plants. These policies encompass a range of areas, including renewable energy targets, environmental regulations, grid integration, incentives, licensing, and international cooperation. When designed and implemented effectively, these policies contribute to the development of clean, reliable, and environmentally responsible large hydroelectric projects that address energy needs while minimizing environmental and social impacts.

Key Market Challenges

Environmental and Social Impacts

+357 96 030922
info@marketpublishers.com

Large hydroelectric power plants, while providing numerous benefits, also pose significant environmental and social challenges that must be carefully managed and mitigated. These challenges often arise due to the alteration of river ecosystems, the construction of dams, and the displacement of communities living near project sites.

One of the primary environmental challenges associated with large hydro power plants is the disruption of river ecosystems. Building dams can change river flows, alter sediment transport, and impact aquatic habitats. These alterations can threaten the survival of fish populations, disrupt sediment balance, and lead to downstream erosion.

Fish migration is a particular concern. Dams can block the natural migration routes of fish species, affecting their reproductive cycles and reducing fish populations. This not only has ecological consequences but can also impact local economies that depend on fishing as a source of income and food.

Additionally, the creation of reservoirs behind dams can submerge large areas of land, including forests, wetlands, and even archaeological sites. This can lead to habitat loss, changes in water quality, and the release of greenhouse gases from submerged vegetation, contributing to carbon emissions.

Social impacts are another significant challenge. The construction of large hydro power plants often requires the displacement of communities living in or near the project area. This displacement can lead to the loss of homes, livelihoods, and cultural heritage. In some cases, affected communities may not receive fair compensation or adequate resettlement support.

Furthermore, the damming of rivers can alter local hydrology, leading to downstream water scarcity in some regions and flooding in others. These changes in water availability can create conflicts among different stakeholders, including farmers, industrial users, and environmental conservationists.

Addressing these environmental and social challenges requires comprehensive environmental impact assessments, robust mitigation measures, and meaningful community engagement. Sustainable development practices, such as the use of fish-friendly turbines, the restoration of affected ecosystems, and transparent resettlement processes, can help mitigate the negative impacts of large hydro power plants.

Climate Change and Changing Hydrology

+357 96 030922
info@marketpublishers.com

Large hydro power plants are often seen as a clean and renewable energy source, but they are not immune to the effects of climate change. Climate change can bring about shifts in precipitation patterns, temperature, and hydrological cycles, posing significant challenges to the reliable operation and performance of these facilities.

One of the primary challenges is changing hydrology. Climate change can lead to altered patterns of rainfall and snowmelt, affecting river flows and water availability. This can result in reduced water inflows to reservoirs, potentially impacting the generation capacity of large hydro power plants.

In regions where large hydroelectric projects rely on glacial meltwater, the retreat of glaciers due to rising temperatures can further exacerbate this challenge. As glaciers shrink, the steady supply of meltwater that these projects depend on may become less reliable, potentially affecting long-term energy production.

Another climate-related challenge is extreme weather events. Climate change is associated with an increased frequency and intensity of extreme weather events, such as floods and droughts. These events can damage infrastructure, disrupt operations, and pose safety risks for large hydro power plants.

Additionally, large hydro power plants can have a role in mitigating climate change by providing grid stability and enabling the integration of intermittent renewable energy sources. However, if their operation is hampered by changing hydrology, this can impact a country's ability to reduce greenhouse gas emissions effectively.

Adapting to these climate-related challenges requires careful planning and investment in climate-resilient infrastructure. This may include optimizing reservoir management to account for changing inflows, upgrading dam safety measures to withstand extreme weather events, and diversifying the energy mix to reduce dependence on hydroelectricity during periods of reduced water availability.

Furthermore, governments and project operators must closely monitor hydrological changes and incorporate climate data into their long-term planning to ensure the continued reliability and sustainability of large hydro power plants in a changing climate.

In conclusion, while large hydro power plants offer numerous advantages in terms of renewable energy generation and grid stability, they also face significant challenges related to their environmental and social impacts, as well as their vulnerability to climate change and changing hydrology. Addressing these challenges requires a holistic

+357 96 030922
info@marketpublishers.com

approach that considers both the benefits and potential drawbacks of large hydroelectric projects, along with robust mitigation measures and adaptation strategies to ensure their long-term sustainability.

Segmental Insights

Pumped Storage Hydropower Insights

The Pumped Storage Hydropower segment held the largest Market share in 2022. One of the primary reasons for the dominance of PSH is its unique ability to provide grid stabilization and flexibility. PSH facilities can rapidly respond to fluctuations in electricity demand. During periods of low demand or excess electricity generation (such as from intermittent renewable sources like wind and solar), surplus electricity is used to pump water to an upper reservoir. When demand spikes, water is released from the upper reservoir to the lower reservoir, passing through turbines to generate electricity. This rapid response helps balance the grid, ensuring a stable and reliable electricity supply. PSH essentially serves as a large-scale energy storage system. It stores excess electricity when supply exceeds demand and releases it when demand exceeds supply. This feature is invaluable in managing variable energy sources like wind and solar, which are subject to weather conditions. PSH helps smooth out the intermittency of renewable energy generation, making it more reliable and grid-friendly. PSH facilities are particularly effective during peak electricity demand periods, which occur daily or seasonally. They can quickly provide a surge of electricity to meet high demand, reducing the need for fossil fuel-based peaker plants that are less efficient and more polluting. PSH plants are known for their high efficiency in converting electricity to stored energy and back to electricity. They also have a long operational lifespan, often exceeding 50 years, making them a reliable and long-term asset for grid operators. In some cases, PSH projects can be built as extensions or enhancements to existing hydropower facilities, leveraging existing dams and reservoirs to reduce construction costs and environmental impacts. As countries strive to reduce greenhouse gas emissions and transition to cleaner energy sources, PSH plays a crucial role in integrating intermittent renewables into the energy mix. It helps maintain grid stability and ensures that renewable energy can reliably meet a growing share of electricity demand. Governments and investors have recognized the value of PSH in the energy transition. Supportive policies, incentives, and investments have encouraged the development of PSH projects worldwide.

Industrial Insights

+357 96 030922
info@marketpublishers.com

The industrial segment held the largest Market share in 2022. Large hydro power plants are capable of generating a significant amount of electricity due to their size and capacity. They often produce electricity on a utility scale, which makes them well-suited to meet the high energy demands of industrial facilities, manufacturing processes, and large-scale operations. Large hydro power plants are typically designed to provide baseload power, meaning they can generate electricity continuously and reliably. This makes them an ideal choice for industrial applications, which often require a stable and uninterrupted power supply to maintain production processes. Large hydro power plants, once operational, can offer cost-competitive electricity compared to other sources. Their relatively low operational and maintenance costs, coupled with their long operational lifespans, make them an attractive option for industrial users seeking cost-effective and reliable energy sources. Large hydroelectric projects are considered a clean and renewable energy source with minimal greenhouse gas emissions during operation. This aligns with the sustainability goals of many industrial organizations and helps them reduce their carbon footprint, which is especially important as environmental regulations and sustainability commitments become more stringent. The reliable and consistent output of large hydro power plants contributes to grid stability. Industrial users often require a stable and resilient power supply to avoid costly disruptions in their operations. Large hydro projects play a role in ensuring energy security for industries. Certain industries, such as metal smelting, chemical manufacturing, and data centers, have substantial energy requirements due to their energy-intensive processes. Large hydro power plants can provide the necessary energy capacity to meet these industrial demands effectively. The feasibility of large hydro power plants is often tied to the availability of suitable water resources and geographical conditions. Many industrial facilities are located near rivers or water bodies, making it convenient to integrate large hydroelectric power into their energy supply. In some regions, governments and utilities may have long-term contracts with large hydro power plant operators to supply electricity to industrial customers at competitive rates. These contracts can provide industrial users with stable and predictable energy costs.

Regional Insights

Asia-Pacific:

The Asia-Pacific region is the largest market for large hydropower plants due to its abundant water resources and growing demand for electricity. China is the world's largest producer of hydropower, accounting for over 30% of global installed capacity. Other major hydropower producers in the region include India, Japan, and Brazil.

+357 96 030922
info@marketpublishers.com

Europe:

Europe is the second-largest market for large hydropower plants, with Norway, Sweden, and Switzerland being the leading producers. Hydropower accounts for a significant share of the electricity mix in many European countries, providing a reliable and affordable source of baseload power.

North America:

North America is the third-largest market for large hydropower plants, with the United States and Canada being the leading producers. Hydropower accounts for a significant share of the electricity mix in both countries and is playing a key role in the transition to a clean energy future.

Key Market Players

China Three Gorges Corporation

Sinohydro Corporation

Andritz Group

GE Hydro Company

Voith GmbH & Co.

Alstom SA

ABB Ltd

Siemens Energy AG

Hitachi Group

Mitsubishi Heavy Industries

Report Scope:

In this report, the Global Large Hydro Power Plants Market has been segmented into

+357 96 030922
info@marketpublishers.com

the following categories, in addition to the industry trends which have also been detailed below:

Large Hydro Power Plants Market, By Type:

Run-Of-River

Pumped Storage Hydropower

Large Hydro Power Plants Market, By Application:

Residential

Commercial

Industrial

Large Hydro Power Plants Market, By Application:

Electric Infrastructure

Electromechanical Equipment

Civil Works

Others

Large Hydro Power Plants Market, By Region:

North America

United States

Canada

Mexico

Europe

+357 96 030922
info@marketpublishers.com

France

United Kingdom

Italy

Germany

Spain

Asia-Pacific

China

India

Japan

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Kuwait

+357 96 030922
info@marketpublishers.com

Turkey

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Large Hydro Power Plants Market.

Available Customizations:

Global Large Hydro Power Plants Market report with the given Market data, Tech Sci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional Market players (up to five).

+357 96 030922
info@marketpublishers.com

Contents

+357 96 030922
info@marketpublishers.com

6. NORTH AMERICA LARGE HYDRO POWER PLANTS MARKET OUTLOOK

7. EUROPE LARGE HYDRO POWER PLANTS MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

8. ASIA-PACIFIC LARGE HYDRO POWER PLANTS MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

9. SOUTH AMERICA LARGE HYDRO POWER PLANTS MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

10. MIDDLE EAST AND AFRICA LARGE HYDRO POWER PLANTS MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

I would like to order

Product name: Large Hydro Power Plants Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Type (Run-Of-River, Pumped Storage Hydropower), By Application (Residential, Commercial, Industrial), By Component (Electric Infrastructure, Electromechanical Equipment, Civil Works, Others), By Region, By Competition, 2018-2028

Product link: https://marketpublishers.com/r/LD19A9CD9AB3EN.html

Price: US$ 4,500.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:
info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page https://marketpublishers.com/r/LD19A9CD9AB3EN.html