India Desalination Plant Market By Technology (Membrane, Thermal, Hybrid), By End-Use Sector (Municipal, Industry, Power, Others), By Region, Competition, Forecast and Opportunities, 2020-2030F

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Report description:

The India Desalination Plant Market was valued at USD 957.33 Million in 2024 and is expected to reach USD 1,728.10 Million by 2030 with a CAGR of 10.18% during the forecast period. The India Desalination Plant Market is witnessing substantial growth due to the increasing demand for potable water, particularly in regions suffering from water scarcity and poor groundwater quality. India, with its vast coastline and an increasing population, faces significant challenges in ensuring a sustainable water supply for its growing urban and agricultural needs. Desalination, the process of removing salts and minerals from seawater to produce fresh water, has become a viable solution to address these issues. As traditional freshwater sources such as rivers and groundwater face depletion and contamination, desalination offers a reliable and efficient method to meet the country's water demands.
The market is primarily driven by the urgent need for water security in coastal cities like Chennai, Mumbai, Kochi, and Mumbai, where freshwater availability is limited and heavily dependent on seasonal rainfall. The implementation of desalination plants is seen as a crucial strategy to mitigate the effects of droughts and water shortages, especially in these urban areas with rapidly increasing populations. , the industrial demand for water in sectors such as power generation, pharmaceuticals, textile manufacturing, and food processing is also a significant driver for the desalination plant market.
Government support plays a vital role in the expansion of the desalination industry. The Indian government has launched several initiatives, including the National Water Mission, to promote water conservation and management, encouraging the adoption of advanced technologies like desalination. private players are increasingly entering the market, attracted by the potential for long-term investment and the need for sustainable water sources. Innovations in reverse osmosis (RO) technology, which forms the backbone of most desalination plants, have significantly reduced operational costs and improved the efficiency of desalinated water production, making it a more economically viable solution for India.
However, the desalination market in India faces challenges such as high energy consumption and environmental concerns related to brine disposal, which may impact marine ecosystems. Despite these concerns, advancements in energy-efficient technologies

and the development of eco-friendly brine management practices are addressing these hurdles. The market is expected to witness continued growth, driven by rising demand for clean water, ongoing technological advancements, and the growing need for sustainable water solutions in India's coastal regions and beyond.

Key Market Drivers

Increasing Water Scarcity and Depletion of Freshwater Resources

India is facing an escalating water crisis, driven by factors such as population growth, climate change, and the depletion of freshwater sources. Rivers, lakes, and groundwater levels are increasingly under pressure due to over-extraction, pollution, and erratic rainfall patterns. This scarcity has made traditional sources of water unsustainable, particularly in coastal cities and arid regions. Desalination offers a reliable and consistent source of potable water by converting seawater into fresh water, ensuring a stable supply for urban, industrial, and agricultural needs. The growing urgency to secure clean water resources is a primary driver of desalination plant adoption across India, particularly in areas where freshwater availability is limited. Over 60% of India's freshwater resources are facing depletion, intensifying the need for alternative water sources like desalination to meet both domestic and industrial water requirements, particularly in water-scarce coastal states.

Government Initiatives and Policies

The Indian government has recognized the importance of desalination in addressing the country's water security challenges and has launched several initiatives to support its growth. Programs such as the National Water Mission and Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) focus on water conservation, infrastructure development, and the promotion of innovative water solutions, including desalination. , state governments in coastal regions have also implemented favorable policies and incentives, encouraging the construction of desalination plants. These government efforts, coupled with financial subsidies and tax exemptions, are key drivers for the market's growth, making desalination an attractive investment for both public and private entities. The Ministry of Jal Shakti has been allocated USD 11.49 billion in 2024-25, towards Department of Drinking Water and Sanitation for the development of water-related infrastructure, including desalination plants, aiming to address water scarcity issues and promote sustainable water management practices.

Growing Urbanization and Industrialization

India's urban population is rapidly increasing, with urban areas becoming the focal points of economic and industrial development. This surge in urbanization places significant pressure on existing freshwater resources. To meet the water demands of rapidly growing cities, desalination plants are being viewed as a strategic solution, particularly in coastal cities like Chennai, Mumbai, and Kochi. These urban areas require large-scale water supply systems to support industries, power generation, and residential areas. Similarly, industrial growth, particularly in water-intensive sectors such as textiles, chemicals, and food processing, necessitates a reliable and sustainable water source, further driving the demand for desalinated water. India's urban population is expected to reach 600 million by 2031, significantly increasing demand for freshwater supply. With more than 50% of India's population projected to live in urban areas, the demand for desalinated water for drinking and industrial use is expected to surge.

Technological Advancements in Desalination

Technological innovation plays a crucial role in making desalination a more viable and cost-effective solution. Reverse Osmosis (RO) technology, which is widely used in desalination plants, has seen significant advancements in terms of energy efficiency, membrane durability, and system performance. These improvements have reduced operational costs and increased the feasibility of desalination, even in areas where it was previously considered too expensive. , advancements in energy recovery devices, which reduce the energy consumption of desalination processes, have made the technology more sustainable. These developments are key drivers, as they improve the economic viability and scalability of desalination plants in India. According to India Desalination Association, there could be more than 1,000 membrane based desalination plants of various capacities ranging from 20m3/day to 10,000m3/day to meet the rising demand for water in coastal and industrial regions.

Key Market Challenges

High Capital and Operational Costs

One of the significant challenges for the India desalination plant market is the high initial capital investment required for setting up desalination facilities. Constructing a desalination plant involves substantial expenditure on infrastructure, technology, and equipment. Reverse Osmosis (RO) systems, which are the most commonly used in desalination, require significant upfront costs for installation and maintenance. The high energy demands of desalination plants, particularly in regions with limited access to

renewable energy, further exacerbate operational costs. As a result, the economic feasibility of desalination projects becomes a key concern, especially for smaller municipalities and industries with limited budgets. Although government subsidies and incentives are available, the financial burden remains a challenge for many stakeholders, limiting the widespread adoption of desalination solutions.

High Energy Consumption

Desalination is an energy-intensive process, particularly reverse osmosis desalination, which requires large amounts of electricity to pump seawater through membranes and remove salts and other impurities. The high energy consumption of desalination plants poses a significant challenge, especially in a country like India, where the energy sector still relies heavily on fossil fuels for power generation. This results in high operational costs and environmental concerns related to the carbon footprint of desalinated water production. As energy prices continue to rise, it becomes increasingly challenging for desalination plants to remain economically viable without incorporating energy-efficient technologies or transitioning to renewable energy sources. , India's current energy infrastructure may struggle to support the growing demand for energy required by desalination plants, potentially leading to grid strain and supply disruptions.

Environmental Concerns and Brine Disposal

The disposal of brine, the highly concentrated saltwater byproduct of the desalination process, presents significant environmental challenges. Brine disposal is a critical concern because its release into the ocean can harm marine life and ecosystems. High concentrations of salt, chemicals, and heavy metals in the brine can damage aquatic habitats, disrupt biodiversity, and affect local fishing industries. Managing brine disposal in an environmentally responsible way is a complex issue that requires careful planning, technological innovation, and regulatory compliance. Despite advances in brine management technologies, the challenge of minimizing the environmental impact of brine remains one of the most contentious issues facing the desalination industry in India.

Water Quality and Contamination Risks

Although desalination plants are designed to produce high-quality drinking water, there are concerns about water quality and the potential for contamination. In some cases, desalinated water may contain residual chemicals used in the filtration process, which could pose health risks if not adequately managed. , the desalination process may fail to remove certain harmful substances, including microplastics and heavy metals, particularly in plants using older or inefficient technologies. The safety of desalinated water depends on the maintenance of the filtration systems, ensuring that water quality is consistently monitored and meets health standards. The risk of contamination, however, increases if the desalination plant is not properly operated or maintained, thereby posing a challenge to public health and safety.

Regulatory and Policy Challenges

The regulatory framework for desalination plants in India is still evolving, and the absence of clear, standardized policies for the construction and operation of these plants presents a challenge. While the Indian government has expressed support for desalination as a means of addressing water scarcity, regulatory hurdles such as land acquisition, environmental clearances, and water usage rights can slow down the implementation of desalination projects. , there is a lack of comprehensive guidelines for monitoring and regulating desalinated water quality, as well as the proper management of brine disposal. These regulatory uncertainties and inconsistencies create risks for investors and developers, limiting the speed at which desalination technologies can be adopted. , shifting government priorities and funding allocations may affect the long-term stability of the desalination market in India.

Key Market Trends

Technological Advancements in Desalination Processes

Technological innovation is rapidly transforming the India desalination plant market. The adoption of more energy-efficient desalination methods, such as reverse osmosis (RO), is driving the growth of the industry. As energy consumption is a major concern in desalination, companies are investing in improving energy efficiency to make desalination plants more cost-effective. Advanced pre-treatment processes, energy recovery devices, and the development of low-energy desalination technologies have all contributed to reducing the environmental and operational costs of these plants. Improvements in desalination membranes and more efficient brine disposal methods are enhancing the sustainability of these plants. The application of solar desalination technologies is also gaining momentum, as renewable energy solutions can reduce operational expenses and environmental

impacts, offering a more sustainable alternative to traditional energy-intensive desalination methods. These technological advances are expected to drive the market forward in the coming years.

Growing Urbanization and Industrial Water Demand

India's rapid urbanization is leading to increased demand for water in urban centers, especially in coastal regions. With population growth, the need for potable water in cities like Chennai, Mumbai, and Kochi is rising at an unprecedented pace. Desalination plants are seen as a sustainable solution to meet this demand, providing a consistent and reliable source of drinking water. The industrial sector, particularly industries such as power generation, textiles, and food processing, also requires large amounts of water, which can further strain freshwater resources. To ensure water security and meet these demands, desalination plants are becoming increasingly integral to the country's water supply infrastructure. As urbanization continues, there will be an increasing need for desalination plants in major cities, contributing significantly to market growth.

Private Sector Investment and Participation

The participation of private players in the India desalination plant market is another growing trend. With the increasing demand for water in both urban and industrial sectors, private companies are seeking opportunities to invest in desalination projects, often through public-private partnerships (PPPs). These collaborations are becoming more common as private companies bring in technological expertise and capital, while governments provide regulatory support and financial incentives. This trend is especially evident in states such as Tamil Nadu and Gujarat, where private companies are involved in the construction and operation of desalination plants. The involvement of the private sector is expected to accelerate the growth of desalination infrastructure in India, as these companies drive innovation and improve operational efficiency. Private investment also helps mitigate the financial burden on the government, making desalination more feasible as a long-term solution to the country's water scarcity challenges.

Environmental and Sustainability Concerns

As desalination technology continues to grow in India, so do the concerns related to its environmental impact. One of the major challenges is the disposal of brine (the byproduct of desalination), which can cause harm to marine ecosystems if not managed properly. To address this, there is an increasing trend toward the development of eco-friendly brine management techniques that ensure minimal environmental damage. The focus is shifting toward making desalination processes more sustainable by using renewable energy sources, such as solar and wind, to power desalination plants. This trend not only helps reduce the carbon footprint of desalination plants but also makes them more cost-effective in the long run. As environmental concerns become more prominent, there will be a continued emphasis on improving sustainability within the desalination industry, driving further innovation and adoption of greener technologies.

Segmental Insights

Technology Insights

Thermal segment dominated in the India Desalination Plant market in 2024, due to its long-established technology, reliability, and suitability for large-scale desalination projects, particularly in coastal areas where the need for freshwater is high. Thermal desalination, primarily through processes like Multi-Stage Flash (MSF) and Multi-Effect Distillation (MED), has been widely used in India, particularly in Gujarat and Tamil Nadu, where industrial and municipal water demand is growing rapidly. One key factor driving the dominance of thermal desalination is its ability to handle large volumes of seawater and produce high-quality freshwater. Thermal desalination plants are particularly advantageous in regions where the energy infrastructure is sufficient to support the high energy requirements of these processes. India's coastal areas, particularly in Mumbai, Chennai, and Kochi, already have access to established energy sources, making thermal desalination a practical choice. The energy recovery systems used in thermal desalination help reduce the overall energy consumption, improving the efficiency and cost-effectiveness of these plants. Tthermal desalination technologies are highly reliable and have been in operation for decades, which provides a sense of confidence for stakeholders in terms of proven performance. This reliability factor is particularly important when dealing with critical water supply systems in urban areas. The thermal segment also benefits from government support, as the National Water Mission and state-level programs provide subsidies for large-scale infrastructure projects like thermal desalination plants. Despite the increasing focus on reverse osmosis (RO) and other technologies, thermal desalination remains the preferred choice for large-scale installations due to its operational scale and ability to meet the growing water demands of industrial and municipal sectors. As the demand for water continues to rise in coastal cities, the thermal desalination segment will continue to lead the market, offering both operational efficiency and scalability to meet India's long-term water security needs.

Regional Insights

South India dominates the India Desalination Plant market in 2024, due to several key factors that make the region particularly conducive to the adoption of desalination technologies. First and foremost, the coastal states of Tamil Nadu, Kerala, Andhra Pradesh, and Karnataka face significant water scarcity issues, making desalination a viable solution to supplement existing water sources. These states experience high levels of water stress due to a combination of limited freshwater resources, unpredictable monsoon patterns, and growing population demands. Coastal areas, in particular, have abundant seawater, which is an ideal resource for desalination processes, giving South India a natural advantage for establishing desalination plants. Tamil Nadu, in particular, is a leader in desalination plant implementation, with major cities like Chennai already relying on desalinated water to meet their urban water supply needs. The city's existing desalination plants have demonstrated the effectiveness of the technology in providing clean drinking water to a growing urban population. The state's strategic location along the coast also facilitates easy access to seawater, making desalination more feasible. South India's high industrial demand for water further drives the need for desalination. The region hosts numerous industries such as textiles, food processing, and power generation, all of which require substantial amounts of water for their operations. As freshwater resources become more strained, desalination plants provide a reliable and sustainable alternative for industries in these sectors.

Government initiatives like the National Water Mission and state-specific schemes also play a significant role in promoting desalination in South India. These initiatives provide financial incentives and regulatory support, which encourage the establishment and expansion of desalination infrastructure. As water scarcity continues to be a major concern, the ongoing development and scaling up of desalination plants in South India will continue to drive its dominance in the market through 2024.

Key Market Players

- VA Tech Wabag Limited
- Thermax Limited
- Ion Exchange (India) Limited
- Doshion Private Limited
- Ide Technologies India Private Limited
- Suez India Private Limited
- Aquatech Systems (Asia) Private Limited
- Hitachi India Private Limited
- Hyflux Engineering (India) Private Limited
- Genesis Global India Operations Private limited

Report Scope:

In this report, the India Desalination Plant Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

- India Desalination Plant Market, By Technology:
  - Membrane
  - Thermal
  - Hybrid
- India Desalination Plant Market, By End-Use Sector:
  - Municipal
  - Industry
  - Power
  - Others
- India Desalination Plant Market, By Region:
  - North India
  - South India
  - West India
  - East India

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the India Desalination Plant Market.
Available Customizations:
India Desalination Plant 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).

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