India Industrial Gases Market By Product Type (Oxygen, Nitrogen, Hydrogen, Carbon Dioxide, Argon and Helium), By Mode of Distribution (Bulk & Cylinder, Tonnage/Gaseous, Packaged), By Region, Competition, Forecast and Opportunities, 2020-2030F

Market Report | 2024-08-02 | 85 pages | TechSci Research

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Report description:

India Industrial Gases Market was valued at USD 3.06 Billion in 2024 and is expected to reach USD 4.04 Billion by 2030 with a CAGR of 4.92% during the forecast period. Industrial gases, including oxygen, carbon dioxide, argon, nitrogen, and hydrogen, play a critical role in various industrial processes and applications. These gases are vital across multiple sectors such as manufacturing (including automotive, steel, and cement), healthcare, chemical processing, and energy production. They are typically delivered in large volumes and come in various forms, such as compressed gases, liquids, and solids.

Companies are increasingly investing in research and development to create new gas mixtures, enhance efficiency, and develop sustainable solutions. The rising influx of foreign direct investment (FDI) and domestic investments in manufacturing and infrastructure is driving the demand for industrial gases. Government initiatives like the Make in India program are supporting industrial growth across sectors that depend on these gases.

There is a growing emphasis on green and sustainable technologies, including carbon capture and storage (CCS) and green hydrogen fuel. This focus is fueling innovation in gas production and application. Companies are also seeking ways to recycle gases and manage waste effectively to reduce environmental impact. Advances such as pressure swing adsorption (PSA), and cryogenic distillation are enhancing the efficiency and cost-effectiveness of gas production.

Customization of gas mixtures for specific industrial processes, such as specialized welding gases or high-purity gases for electronics, is increasingly in demand. Additionally, heightened awareness and regulatory requirements concerning safety and

environmental impact are influencing market practices. Robust infrastructure for transportation and distribution is essential for market growth. Fluctuations in raw material prices can affect profitability. The integration of digital technologies in gas monitoring, control systems, and remote management is improving operational efficiency and safety, with smart sensors and IoT playing a key role.

The Indian industrial gases market is set for expansion, driven by industrial growth, technological advancements, and changing consumer needs. Strategic investments in infrastructure and technology will be crucial for companies to leverage emerging opportunities in this growing market.

Key Market Drivers

Growth of Healthcare sector

As disposable incomes and healthcare expenditures increase, investments in healthcare infrastructure, equipment, and technologies which rely on industrial gases are also rising. Enhanced health insurance coverage and financing options are allowing more individuals to access advanced medical treatments and facilities, thereby boosting the demand for medical gases. According to the Economic Survey 2022-23, India's public healthcare spending reached 2.1% of GDP in FY23 and 2.2% in FY22, up from 1.6% in FY21.

Government initiatives such as Ayushman Bharat and other programs aimed at enhancing healthcare access and quality often require substantial investments in medical gases and related infrastructure. The COVID-19 pandemic underscored the essential role of medical gases in patient care, prompting increased investments in healthcare infrastructure and gas supply systems. Additionally, the Indian government plans to introduce a USD 6.8 billion credit incentive program to further strengthen the country's healthcare infrastructure.

The growth in new hospitals, clinics, and diagnostic centers across both urban and rural areas is driving the need for medical gases. Oxygen, crucial for respiratory care, is used extensively in hospitals for emergency situations, surgeries, and treating chronic respiratory conditions. Medical air and nitrogen are employed in various healthcare applications, including powering medical equipment and preserving medical supplies, while carbon dioxide is used in procedures like laparoscopic surgeries to facilitate better visualization. The emphasis on improving patient outcomes and care quality is increasing the demand for advanced medical gases and systems.

As healthcare facilities continue to expand and modernize, the need for high-quality, reliable medical gases and delivery systems will grow, positioning the healthcare sector as a key driver of growth in the industrial gases market.

Rising Focus on clean energy

The emphasis on clean energy is profoundly affecting the industrial gases market in India, driving increased demand for gases used in hydrogen production, carbon capture, renewable energy technologies, and sustainable industrial practices. Government policies and incentives designed to promote clean energy and reduce carbon emissions are fostering growth in the industrial gases sector. Carbon capture and storage technologies, aimed at lowering greenhouse gas emissions from industrial activities, are increasing the need for gases involved in capturing, transporting, and storing carbon dioxide.

India is set to introduce a carbon capture policy later in 2024, which will encourage companies to capture, recycle, and store their emissions underground, while still utilizing the country's extensive coal resources. Additionally, there is a rising focus on hydrogen as a clean energy source for fuel cells and energy storage, boosting demand for hydrogen production technologies and related industrial gases. In January 2024, the Union Ministry of New and Renewable Energy (MNRE) issued guidelines and incentives under the National Green Hydrogen Mission to promote the acquisition of green hydrogen. The USD 2.09 billion allocated for the Strategic Interventions for Green Hydrogen Transition (SIGHT) program aims to enhance domestic electrolyser manufacturing and green hydrogen production, with incentives designed to reduce costs and accelerate growth. Financial incentives, such as subsidies and grants, support the development of clean energy technologies that rely on industrial gases.

Innovations in energy storage, including advanced batteries and supercapacitors, often require specialized gases like nitrogen for their production and use. In 2023, INOX Air Products secured a 20-year contract with First Solar, a prominent American solar technology firm and global leader in photovoltaic (PV) solar energy solutions. This partnership involves overseeing the design, engineering, installation, and operation of a Cryogenic Nitrogen Generator, which will provide high-purity nitrogen for First Solar's

new manufacturing facility in Pillaipakkam, Tamil Nadu. As clean energy initiatives expand into both urban and rural areas, the demand for industrial gases in these emerging markets is growing, including in remote or underserved regions. As India continues to prioritize clean energy, the industrial gases market is set to expand, presenting new opportunities for innovation and development.

Key Market Challenges

Price Volatility

Price volatility poses a significant challenge in the Indian industrial gases market, affecting cost management, pricing strategies, and overall profitability. The prices of raw materials used in gas production, such as natural gas, air, and other chemicals, can fluctuate unpredictably. For instance, in July 2024, the government raised the price of natural gas to USD 8.51 per metric million British thermal unit (mmBtu) for August, up from USD 8.24 in July. This volatility can make it difficult for companies to pass increased production costs onto customers due to competitive pressures, potentially eroding profit margins.

Intense market competition compels companies to carefully manage pricing. Frequent adjustments in response to changing raw material costs can complicate pricing strategies and strain customer relationships. Additionally, price volatility introduces uncertainty into capital investment decisions. Companies may delay or reconsider investments in new technologies or infrastructure due to concerns about future price stability, which can affect projected returns on investment (ROI).

Price fluctuations can impact on contract negotiations with customers and suppliers, making long-term contracts or fixed-price agreements more complex. To address these challenges, companies must implement effective cost control measures to mitigate the effects of price swings and maintain financial stability.

Infrastructure Constraints

Infrastructure constraints pose a major challenge in the Indian industrial gases market, affecting production, distribution, and overall efficiency. Insufficient transportation networks and logistics infrastructure can impede the smooth movement of industrial gases from production sites to end-users. Issues such as poor road conditions, limited rail connectivity, and disruptions in the supply chain including traffic congestion and inadequate warehousing can delay gas delivery, impacting both customer satisfaction and operational efficiency. There is also a lack of advanced storage facilities for industrial gases, particularly in remote or underserved areas. This shortfall can affect the availability and reliability of gas supplies. Proper storage solutions are essential for safe gas handling, and inadequate infrastructure can introduce safety risks and lead to regulatory compliance issues and higher operational costs.

Outdated or inefficient production technologies can decrease overall efficiency and increase production costs. Upgrading to modern technologies necessitates significant capital investment. Additionally, uneven infrastructure development across different regions can lead to inconsistent service levels and potential market imbalances. Navigating the regulatory approvals and securing necessary permits for infrastructure projects can be both time-consuming and complex, further complicating the development of new facilities. Overcoming these challenges requires strategic investments, improved planning, and cooperation between industry stakeholders and government bodies. Enhancing infrastructure is vital for supporting market growth, increasing efficiency, and meeting the rising demand for industrial gases.

Key Market Trends

Shift Towards Circular Economy

Companies are advancing technologies to recycle industrial gases, such as carbon dioxide, which can be captured, purified, and repurposed in various processes. This approach minimizes waste and optimizes resource utilization. For instance, in 2024, Oil India, with government backing, launched a carbon capture and storage project. This initiative focuses on capturing CO? emissions from Oil India's natural gas field in Rajasthan and securely storing them in nearby dry wells, supporting the company's objective of achieving net-zero emissions by 2040.

The implementation of closed-loop systems for gas handling is another strategy to reduce emissions and waste by recapturing and reusing gases within the production cycle. Emphasizing sustainable practices to minimize by-products and waste associated with gas production and processing is becoming increasingly important for reducing environmental impact and improving efficiency.

Investment in green technologies and innovations supporting circular economy principles is on the rise. This includes the development of low-impact gases and technologies that enhance environmental sustainability. For example, in 2023, the

clean-tech company GR2L in Surrey, England, secured a USD4.9 million order to provide its argon recycling technology, ArgonO, to Mundra Solar for a 2 GW solar facility in India. This technology can recycle up to 95% of argon used in silicon wafer fabrication for solar panels.

Companies are investing in technologies and practices aimed at controlling and reducing emissions from industrial processes. This includes advanced filtration and scrubbing systems for effective emission management. Researchers at the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) are investigating the use of CO? in syngas (synthetic gas) technology, which contributes to a more sustainable and circular economy. In 2024, Tata Steel partnered with JNCASR to develop CO? conversion technology at a laboratory scale, with Professor Sebastian C. Peter leading the project and Tata Steel funding the research.

The shift towards a circular economy fosters practices that reduce the carbon footprint of industrial gas operations, aligning with both global and national sustainability goals. Adopting this trend is essential for enhancing resource efficiency, minimizing environmental impact, and maintaining a competitive edge in the evolving industrial gases market.

Segmental Insights

Product Type Insights

Based on Product Type, the Hydrogen emerged as the fastest growing segment in the Indian market for Industrial Gases during the forecast period. India is placing increasing emphasis on hydrogen as a key clean energy source. The government's initiatives, particularly the National Green Hydrogen Mission launched on January 4, 2023, with a funding allocation of USD 2.36 billion through FY 2029-30, are designed to make hydrogen a central element of the country's clean energy strategy. Significant investments are being directed towards the production of green hydrogen, generated from renewable energy sources, aligning with global trends toward sustainable energy solutions. To support this, the Indian government is rolling out policies and incentives to boost hydrogen production and usage. This includes financial backing for research, development, and scaling up hydrogen technologies. In July 2024, the Ministry of New and Renewable Energy (MNRE) introduced guidelines for the second phase of the Strategic Interventions for Green Hydrogen Transition (SIGHT) Programme Component II, which focuses on incentivizing green hydrogen production. This program aims to expand India's green hydrogen production capacity to 450,000 tonnes per annum (TPA), with 40,000 TPA designated for biomass-based pathways (bucket-II) and the remainder for technology-agnostic pathways (bucket-I).

Hydrogen is increasingly utilized in fuel cells for automotive, power generation, and other sectors. The expansion of the electric vehicle market, especially hydrogen fuel cell vehicles, is driving demand. In April 2024, Ohmium International announced a strategic partnership with Tata Projects, a prominent sustainable technology EPC company in India. This collaboration seeks to advance green hydrogen projects in India by combining innovative technology with engineering expertise. Ohmium will supply PEM electrolyzers, while Tata Projects will oversee the entire EPC process, including engineering, design, integration, and optimization. Technological advancements in hydrogen production, such as electrolysis and steam methane reforming with carbon capture, are enhancing the viability and cost-effectiveness of hydrogen. Additionally, in July 2024, India and Austria announced a sustainable economic partnership, supporting collaboration between institutions in renewable energy and green hydrogen. As infrastructure develops and costs fall, the hydrogen sector is expanding rapidly, driven by growing adoption across various industries.

Mode of Distribution Insights

Based on Mode of Distribution, Bulk & Cylinder emerged as the dominating segment in the Indian market for Industrial Gases in 2024. Industries like steel, cement, chemicals, and petrochemicals require substantial amounts of gases such as oxygen, nitrogen, and hydrogen, which are efficiently delivered through bulk distribution. This mode of distribution provides cost benefits for high-volume needs, while cylinders offer a versatile solution for varied and smaller-scale applications. The integration of bulk and cylinder distribution ensures a well-balanced supply chain that addresses different demand levels and operational requirements. As industrial activities grow, the demand for both bulk and cylinder gases rises, serving a range of applications from large industrial operations to smaller workshops and facilities. Key sectors like manufacturing, healthcare, and food processing depend on both distribution methods for their gas supply needs. For example, Confidence Petroleum has invested Rs 350 crore in its Nagpur plant, with plans to initially produce 100,000 type 4 cylinders, increasing to 300,000 units in the coming years. These cylinders are 30% lighter than traditional steel ones, enabling them to store more fuel such as green hydrogen and cover greater distances on a single fill. They are also more robust, designed to endure higher pressures and temperatures. This expansion

reflects the growing need for both bulk and cylinder gases across various industrial applications.

Regional Insights

Based on Region, West India emerged as the dominant region in the Indian market for Industrial Gases in 2024. States like Gujarat and Maharashtra in Western India are major industrial centers, hosting a significant number of industries including petrochemicals, steel, automotive, and pharmaceuticals, all of which have substantial needs for industrial gases. In 2023, INOX Air Products announced plans to construct its sixth Air Separation Unit (ASU) at the Hazira plant of AM/NS India in Gujarat. This new ASU will have a daily production capacity of 1,000 tons of oxygen and nitrogen. Once completed, it will elevate the total capacity of the industrial gas complex to 11,100 tons per day.

Western India boasts a well-developed infrastructure for the production, storage, and distribution of industrial gases. Major ports such as Mumbai and Kandla play a crucial role in facilitating the import and export of these gases. The region's advanced logistics network supports the efficient and timely distribution of industrial gases across various industries. Many leading industrial gas companies have invested heavily in Western India, establishing large production facilities and extensive distribution networks to cater to the high demand. In June 2024, Essar Group announced plans to invest USD 3.58 billion over the next four years to set up a green hydrogen plant in Jamnagar, Gujarat. Additionally, in 2024, NTPC Green Energy Limited (NGEL), a wholly owned subsidiary of NTPC, formalized a Memorandum of Understanding with the Government of Maharashtra. This agreement outlines collaborative efforts to develop Green Hydrogen and its derivatives, with a target capacity of up to 1 million tons per annum.

The Western region's diverse industrial base, which includes sectors such as chemicals, textiles, and food processing, continuously drives demand for various types of industrial gases. The combination of significant industrial activities, advanced infrastructure, and substantial investments underscores the Western region's dominance in the Indian industrial gases market.

Key Market Players

?□Linde plc
?□Praxair Technology, Inc.
?□Taiyo Nippon Sanso India Pvt Ltd.
?□INOX Air Products Private Limited
?□Bhuruka Gases Limited
?□Bombay Oxygen Investments Ltd.
?□Ellenbarrie industrial Gases Ltd.
?□Air Liquide India
?□Goyal MG gases pvt.ltd
?□SICGIL India Limited

Report Scope:

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

?□India Industrial Gases Market, By Product Type:
- o Oxygen
- o Nitrogen
- o Hydrogen
- o Carbon Dioxide
- o Argon
- o Helium

?□India Industrial Gases Market, By Mode of Distribution:
- o Bulk & Cylinder
- o Tonnage/Gaseous
- o Packaged

?□India Industrial Gases Market, By Region:
- o West India
- o North India

o South India
o East India
Competitive Landscape
Company Profiles: Detailed analysis of the major companies presents in the India Industrial Gases Market.
Available Customizations:
India Industrial Gases 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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