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Air Separation Unit Market – Global Industry Size, Share, Trends, Opportunity, and ForecastSegmented by Process (Cryogenic Distillation and Non-cryogenic Distillation), Gas (Nitrogen, Oxygen, Argon, and other gases), End User (Chemical Industry, Oil and Gas Industry, Iron and Steel Industry, and Other End Users), By Region, Competition, 2018-2028

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Abstracts

Global Air Separation Unit market Was valued at USD 4.63 Billion in 2022 and is anticipated to project robust growth in the forecast period with a CAGR of 4.05% through 2028.

Key Market Drivers

Industrial Growth will help with Air Separation Unit Market growth.

The global air separation unit (ASU) market is poised for substantial growth, primarily propelled by the ongoing industrial expansion across various sectors. ASUs, which are pivotal for the production of oxygen, nitrogen, and argon, play an indispensable role in sustaining and driving this industrial growth. One of the primary drivers for the ASU market is the continuous expansion of the metallurgical industry. Industries involved in steel production and metal fabrication rely heavily on oxygen and nitrogen for processes like oxyfuel cutting, welding, and heat treatment. As urbanization and infrastructure development surge globally, particularly in emerging economies, the demand for steel and metal products is soaring, driving the need for ASUs to meet these industrial gas requirements.

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The healthcare sector also contributes significantly to the growth of the ASU market. The pandemic has underscored the critical importance of a reliable supply of medical oxygen for respiratory therapies and other medical applications. The healthcare industry's growth and increasing emphasis on healthcare infrastructure are driving the demand for ASUs to ensure a steady supply of medical-grade gases. Chemical manufacturing is another major driver for ASUs. The chemical industry relies on oxygen and nitrogen for various processes, including combustion, oxidation, and inserting. As the demand for chemicals continues to grow for applications in agriculture, pharmaceuticals, and materials science, the need for ASUs to provide high-quality gases is on the rise.

Furthermore, the electronics and semiconductor manufacturing sector depend on ultra-pure gases, particularly nitrogen, in its production processes. As the demand for electronic devices, from smartphones to electric vehicles, continues to surge, the ASU market experiences corresponding growth. Emerging markets, characterized by rapid industrialization, are significant contributors to the ASU market's expansion. As developing nations establish and expand their industrial bases, they require ASUs to meet the growing demand for industrial gases across various sectors. In conclusion, industrial growth across multiple sectors, including metallurgy, healthcare, chemicals, and electronics, is a driving force behind the global ASU market. The increasing demand for oxygen, nitrogen, and argon in these industries, coupled with the need for specialized gases, underscores the critical role ASUs play in supporting and fueling industrial expansion worldwide. This trend is expected to persist and potentially accelerate as global industrialization continues to evolve.

Energy and Environment Have Played a Crucial Role in The Growth of The Air Separation Unit Market

The global air separation unit (ASU) market is poised for significant growth, primarily driven by the ever-increasing focus on energy efficiency and environmental sustainability. In an era marked by growing concerns about climate change and the need to reduce greenhouse gas emissions, ASUs are emerging as crucial components in the global effort to mitigate environmental impact while meeting the energy demands of various industries. Energy efficiency is a paramount driver of the ASU market. ASUs are energy-intensive facilities that separate air into its primary components, such as oxygen, nitrogen, and argon. The demand for these gases across industries continues to rise, making energy-efficient ASUs an attractive proposition. Advancements in ASU technology have led to improved energy performance, reducing the carbon footprint of gas production. Energy-efficient ASUs not only lower operating costs but also align with

global sustainability goals.

The environmental imperative plays a central role in driving the ASU market. ASUs are pivotal in carbon capture and storage (CCS) initiatives, a critical strategy in addressing climate change. CCS involves capturing carbon dioxide (CO2) emissions from industrial processes and power plants and storing them underground to prevent their release into the atmosphere. ASUs are essential for providing high-purity oxygen, which facilitates combustion processes required for CCS, enabling the reduction of CO2 emissions. Governments and regulatory bodies worldwide are imposing stringent emissions standards, further boosting the ASU market's growth. In response to these regulations, industries are increasingly adopting cleaner technologies and processes that rely on ASUs to provide gases in a more environmentally friendly manner.

Furthermore, ASUs contribute to the transition to cleaner energy sources. For instance, ASUs are crucial in the production of liquid hydrogen, a key element in the development of hydrogen-based energy systems, which are gaining traction as a sustainable alternative to fossil fuels. In conclusion, the global ASU market is being propelled forward by the dual forces of energy efficiency and environmental responsibility. As industries seek to meet their gas demands while minimizing their environmental footprint, ASUs are at the forefront of this transformation, poised to play a pivotal role in shaping a greener and more sustainable future. Investments in energy-efficient ASUs and their integration into cleaner energy and environmental initiatives are set to drive the market's expansion in the coming years.

Key Market Challenges

High Initial Capital Investment

The global air separation unit (ASU) market faces a substantial challenge in the form of high initial capital investment requirements. Setting up an ASU facility involves significant upfront costs that can deter potential investors and hinder market growth in several ways. Firstly, the capital-intensive nature of ASUs can limit market entry, particularly for smaller companies or startups with limited financial resources. This barrier to entry can reduce competition within the market, potentially leading to higher prices for industrial gases and limiting consumer choices.

Secondly, the high initial capital investment can prolong the return on investment (ROI) period for ASU projects. Companies may hesitate to make substantial financial commitments when the payback period is extended, which can slow down market

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expansion and the adoption of ASUs in industries that require these gases. Moreover, securing funding for ASU projects can be challenging, especially in regions or industries where access to capital is limited. Financial institutions may perceive ASU projects as high-risk due to the significant investment required and the lengthy period needed to recoup costs, further hampering market growth.

Additionally, the capital-intensive nature of ASUs can hinder technological advancements and innovation. Companies may be reluctant to invest in research and development for more efficient or sustainable ASU technologies when they are already heavily invested in existing facilities. This can impede the industry's ability to adapt to changing market demands and regulatory requirements. To address the challenge of high initial capital investment, industry stakeholders may explore strategies such as partnerships, financing options, and government incentives to incentivize ASU adoption. Government support, in particular, through grants, subsidies, or tax incentives, can help lower the financial burden and encourage investment in ASUs, ultimately facilitating market growth and the adoption of these critical gas separation units.

Environmental Regulations

Environmental regulations can indeed pose significant challenges to the global air separation unit (ASU) market. While these regulations are essential for mitigating environmental impact and promoting sustainability, they can also increase costs and introduce complexities into ASU operations. One of the primary ways in which environmental regulations can hamper the ASU market is through stricter emissions standards. ASUs are energy-intensive facilities, and their operations can result in emissions of greenhouse gases, particularly carbon dioxide (CO2). To comply with regulations aimed at reducing CO2 emissions, ASU operators may need to invest in cleaner technologies, such as carbon capture and storage (CCS). The implementation of CCS technologies, while environmentally beneficial, can be expensive and add operational complexity.

Additionally, environmental regulations can impact the choice of energy sources for ASUs. Some regions or countries may impose restrictions on the use of certain fuels or energy-intensive processes, pushing ASU operators to adopt cleaner energy options, such as renewable energy sources or low-carbon electricity. This transition can entail substantial costs and require significant adjustments to existing infrastructure.

Furthermore, regulations related to air quality and emissions of pollutants can affect ASU operations. ASUs release various gases into the atmosphere during their

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processes, and compliance with air quality standards can necessitate the installation of additional pollution control equipment, adding to operational expenses. In summary, while environmental regulations are essential for protecting the environment and human health, they can introduce challenges for the ASU market. Compliance can lead to increased costs, technological investments, and operational adjustments. To navigate these challenges successfully, ASU operators must stay informed about evolving regulations, invest in sustainable technologies, and adopt proactive environmental management practices to ensure long-term viability in an increasingly regulated landscape.

Key Market Trends

Growing Industrial Gas Demand

The global air separation unit (ASU) market is experiencing a significant boost due to the growing demand for industrial gases across diverse sectors. These gases, which include oxygen, nitrogen, and argon, serve as essential raw materials and aids in various industrial processes, contributing to the market's expansion. One of the primary drivers of the ASU market is the robust growth in industrial gas demand, stemming from several key sectors Healthcare and Medical Applications: The healthcare sector relies heavily on medical gases such as oxygen and nitrogen for respiratory therapies, medical equipment calibration, and pharmaceutical manufacturing. The ongoing global health concerns, like the COVID-19 pandemic, have further accelerated the demand for these gases, driving the need for ASUs, Manufacturing and Metallurgy: The manufacturing industry, including sectors like automotive, aerospace, and electronics, depends on industrial gases for processes such as welding, heat treatment, and materials processing. As industrial production continues to expand, so does the demand for ASUs to provide these critical gases.

In conclusion, the growing demand for industrial gases across diverse industries is a pivotal factor propelling the global ASU market. As these sectors continue to evolve and expand, the requirement for ASUs to provide a reliable supply of high-quality gases remains paramount, ensuring a bright and promising future for the ASU market.

Hydrogen Production

Hydrogen production is emerging as a powerful driver for the global air separation unit (ASU) market. Hydrogen, often touted as the 'fuel of the future,' is gaining immense traction as a clean and sustainable energy carrier. ASUs are instrumental in hydrogen

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production, particularly in conventional methods like steam methane reforming (SMR).

Green Hydrogen: With the global focus on reducing carbon emissions, green hydrogen production is on the rise. ASUs play a crucial role by providing high-purity oxygen for the electrolysis of water, powered by renewable energy sources. As the demand for green hydrogen surges, so does the demand for ASUs. Blue Hydrogen: Even in blue hydrogen production, where hydrogen is generated from natural gas with carbon capture and storage (CCS) to mitigate emissions, ASUs are essential. They supply oxygen for combustion and support CCS efforts. As industries seek lower-carbon alternatives, the ASU market benefits.

Transportation: Hydrogen fuel cell vehicles are gaining traction as zero-emission transportation solutions. ASUs are integral in providing the hydrogen needed to power these vehicles. As the automotive sector pivots toward cleaner mobility, hydrogen production via ASUs is expected to expand.

In conclusion, the pivotal role of hydrogen in the global clean energy transition is propelling the ASU market forward. The increasing recognition of hydrogen's potential as a clean energy carrier and its applications in decarbonizing various sectors is driving substantial demand for ASUs. This aligns with international efforts to curb greenhouse gas emissions and usher in a sustainable, low-carbon energy era, positioning hydrogen production as a key catalyst in the evolution of the ASU market.

Segmental Insights

End User Insights

The market's largest contribution will be the Iron and Steel segment. The iron and steel industry are one of the major consumers of ASUs, as steel production requires massive amounts of oxygen, most of which is sourced from the air using ASU technology. It is estimated that more than half of the global steel production uses the basic oxygen process (BOP), which uses pure oxygen to convert a charge of liquid blast-furnace iron and scrap into steel. Hence, most steel plants install large ASUs to cater to the oxygen demand, which forms a critical part of plant operations.

Therefore, based on the abovementioned factors, the iron and steel end-user segment are expected to witness significant demand for the global air separation unit market during the forecast period.

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Regional Insights

Asia Pacific has established itself as the leader in the Global Air Separation Unit Market with a significant revenue share in 2022.

Asia-Pacific accounted for the largest air separation unit market share and is expected to continue its dominance during the forecast period. China is the world's second-largest oil consumer but the sixth-largest oil producer. It imports nearly 50% of its hydrocarbon demand, and to reduce dependence on energy imports and improve energy security, China has been trying to maximise its shale potential by exploiting its domestic reserves across various inland shale basins, such as the Sichuan basin.

In January 2022, Air Liquide announced an investment of about INR 350 crore in a new air separation unit dedicated to industrial merchant activities in Kosi, Uttar Pradesh, India. This unit will have a production capacity of 350 tons per day with a maximum of 300 tons of oxygen. The plant is likely to be operational by the end of this year. As a result, the increasing uptake of ASUs from the iron and steel, oil and gas, and chemical end user segments, majorly from China and India, is expected to increase the demand for air separation units in the region.

Key Market Players

Linde AG

Messer Group GmbH

Siad Macchine Impianti Spa

Shanghai Chinllenge Gases Co. Ltd

Taiyo Nippon Sanso Corporation

Air Liquide SA

Air Products and Chemicals Inc.

Universal Industrial Plants Mfg Co. Pvt Ltd

Bhoruka Gases Limited

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Sichuan Air Separation Plant Group

Report Scope:

In this report, the Global Air Separation Unit Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Air Separation Unit Market, By Process:

Cryogenic Distillation

Non-cryogenic Distillation

Air Separation Unit Market, By Gas:

Nitrogen

Oxygen

Argon

Other Gases

Air Separation Unit Market, By End User:

Chemical Industry

Oil and Gas Industry

Iron and Steel Industry

Other End Users

Air Separation Unit Market, By Region:

North America

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United States

Canada

Mexico

Asia-Pacific

China

India

Japan

South Korea

Indonesia

Europe

Germany

United Kingdom

France

Russia

Spain

South America

Brazil

Argentina

Middle East & Africa

Saudi Arabia

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South Africa

Egypt

UAE

Israel

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Air Separation Unit Market.

Available Customizations:

Global Air Separation Unit 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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