

The Global Market for Industrial Gases 2025-2035 (Oxygen, Nitrogen, Hydrogen, Helium, Carbon Dioxide, Argon, Other Types)

<https://marketpublishers.com/r/G7312CD9D027EN.html>

Date: September 2024

Pages: 790

Price: US\$ 1,900.00 (Single User License)

ID: G7312CD9D027EN

Abstracts

The global industrial gases market is poised for significant growth and transformation in the period from 2025 to 2035. This report provides a comprehensive analysis of market trends, key players, technological advancements, and emerging applications that will shape the industry over the next decade. With a focus on sustainability, energy transition, and innovative technologies, the industrial gases sector is set to play a crucial role in various industries, from manufacturing and healthcare to emerging fields like hydrogen energy and carbon capture.

The industrial gases market is a critical component of the global economy, serving as an essential input for numerous industries. As of 2025, the market's importance is underpinned by several factors:

Manufacturing Support: Industrial gases are vital in manufacturing processes across sectors such as steel, chemicals, electronics, and food processing. They enable efficient production, improve product quality, and enhance process safety.

Healthcare Applications: Medical gases, including oxygen, nitrous oxide, and medical air, are crucial in healthcare settings for patient treatment, surgical procedures, and life support systems.

Environmental Solutions: Industrial gases play a key role in environmental applications, including water treatment, air pollution control, and greenhouse gas reduction technologies.

Energy Sector: The gases industry supports various aspects of the energy sector, from enhanced oil recovery to the emerging hydrogen economy.

The period from 2025 to 2035 is expected to see renewed interest in the industrial gases market, driven by several factors:

Energy Transition: The global push towards decarbonization and clean energy solutions has put a spotlight on industrial gases, particularly hydrogen and its role in the energy transition.

Sustainability Initiatives: Companies across industries are increasingly focusing on reducing their carbon footprint, leading to greater demand for industrial gases in carbon capture and utilization technologies.

Technological Advancements: Innovations in production, distribution, and application of industrial gases are opening new market opportunities and improving efficiency.

Healthcare Expansion: The ongoing global focus on healthcare infrastructure development, especially in emerging markets, is driving demand for medical gases and related technologies.

Space Exploration: Renewed interest in space missions and the potential for space industrialization is creating new demand for specialized industrial gases.

The industrial gases market is expanding into new territories and applications, which are expected to be significant growth drivers from 2025 to 2035:

Green Hydrogen: The production, storage, and distribution of green hydrogen for use in transportation, industry, and power generation represent a major new market for the industrial gases sector.

Carbon Capture, Utilization, and Storage (CCUS): As governments and industries seek to reduce greenhouse gas emissions, CCUS technologies are gaining traction, creating new opportunities for industrial gas companies.

3D Printing/Additive Manufacturing: The growth of additive manufacturing is

increasing demand for specialized gases used in the production process.

Electronics and Semiconductor Industry: The continued expansion of the electronics industry, including the development of advanced semiconductors and display technologies, is driving demand for high-purity gases.

Biotechnology and Life Sciences: The rapid growth of the biotechnology sector is creating new applications for industrial gases in research, production, and storage of biological materials.

Vertical Farming and Controlled Environment Agriculture: The expansion of indoor farming techniques is increasing demand for CO₂ and other gases used to enhance plant growth.

As the nuclear industry faces challenges from the growth of renewable energy in conventional power production, it is increasingly looking towards industrial gas production as a potential new revenue stream and way to utilize its existing infrastructure and expertise. This trend is driven by several factors:

Hydrogen Production: Nuclear plants can use their excess heat and electricity to produce hydrogen through high-temperature electrolysis, potentially offering a cost-effective and low-carbon method of hydrogen production at scale.

Oxygen Production: The electrolysis process used for hydrogen production also generates pure oxygen as a by-product, which can be captured and sold for industrial use.

Utilization of Existing Infrastructure: Nuclear plants have extensive electrical and cooling infrastructure that can be leveraged for industrial gas production, potentially lowering capital costs.

Stable Baseload Power: Nuclear plants provide constant, reliable power that is well-suited to the continuous operation required for many industrial gas production processes.

Carbon-Free Production: As industries seek to decarbonize their supply chains, nuclear-powered industrial gas production offers a low-carbon alternative to traditional fossil fuel-based methods.

The report segments and analyzes the industrial gases market along several dimensions:

By Gas Type:

Nitrogen

Oxygen

Hydrogen

Carbon Dioxide

Argon

Helium

Specialty Gases

By End-Use Industry:

Manufacturing and Metallurgy

Chemicals and Petrochemicals

Healthcare and Pharmaceuticals

Food and Beverage

Electronics and Semiconductors

Energy and Power Generation

Aerospace and Aviation

Others (e.g., Environmental, Research)

By Production Method:

Air Separation Units (ASUs)

Steam Methane Reforming

Electrolysis

By-Product Recovery

Others (e.g., Nuclear-Powered Production)

By Distribution Mode:

On-Site/Pipeline

Bulk

Packaged Gas/Cylinders

The report examines key technological advancements that are shaping the future of the industrial gases market:

Advanced Air Separation Technologies: Improvements in cryogenic distillation and non-cryogenic separation methods are increasing efficiency and reducing energy consumption.

Hydrogen Production Technologies: Advancements in electrolysis, including high-temperature electrolysis and polymer electrolyte membrane (PEM) electrolysis, as well as emerging technologies like methane pyrolysis.

Carbon Capture and Utilization: Innovations in capture technologies, including direct air capture, and new applications for captured CO₂.

IoT and Digital Technologies: Implementation of smart sensors, predictive maintenance, and digital supply chain management in gas production and distribution.

Advanced Materials: Development of new materials for gas storage, separation membranes, and catalysts.

The report provides an in-depth analysis of the competitive landscape, including:

Market Share Analysis: Examination of the global and regional market shares of key players.

Company Profiles: Detailed profiles of major companies, including their product portfolios, financial performance, and strategic initiatives. Companies profiled include Air Liquide, Generon, IACX Energy, Linde plc, Air Products and Chemicals, Inc., Messer Group, Taiyo Nippon Sanso Corporation

Competitive Strategies: Analysis of key strategies employed by market leaders, such as mergers and acquisitions, joint ventures, and product innovations.

Emerging Players: Identification and analysis of new entrants and innovative startups disrupting the market.

The report provides detailed market forecasts for the period 2025-2035, including:

Market Size Projections: Overall market size and growth rates, segmented by gas type, end-use industry, and region.

Technology Adoption Trends: Forecasts for the adoption of new technologies and production methods.

Emerging Application Areas: Projections for growth in new and emerging applications of industrial gases.

Scenario Analysis: Multiple scenarios considering factors such as economic conditions, technological advancements, and regulatory changes.

The global industrial gases market is entering a period of significant transformation and growth from 2025 to 2035. Driven by the energy transition, technological advancements, and emerging applications, the industry is poised to play a crucial role in addressing

global challenges such as climate change and sustainable industrial development. The involvement of the nuclear industry in gas production represents a notable shift, potentially offering new, low-carbon production methods at scale. As the market evolves, companies that can innovate, adapt to changing regulations, and capitalize on new opportunities will be well-positioned for success in this dynamic and essential industry.

Contents

1 INTRODUCTION TO INDUSTRIAL GASES

- 1.1 Definition and Classification of Industrial Gases
- 1.2 Major Types of Industrial Gases
 - 1.2.1 Oxygen
 - 1.2.2 Nitrogen
 - 1.2.3 Argon
 - 1.2.4 Hydrogen
 - 1.2.5 Carbon Dioxide
 - 1.2.6 Helium
 - 1.2.7 Acetylene
 - 1.2.8 Other Specialty Gases
- 1.3 Key Applications and End-Use Industries
- 1.4 Production Methods and Technologies
 - 1.4.1 Air Separation Units (ASUs)
 - 1.4.2 Steam Methane Reforming
 - 1.4.3 Electrolysis
 - 1.4.4 By-Product Recovery
- 1.5 Distribution and Supply Chain Dynamics

2 GLOBAL MARKET OVERVIEW

- 2.1 Global Industrial Gas Market Size
 - 2.1.1 By Gas Type
 - 2.1.2 By End-Use Industry
 - 2.1.3 By Supply Mode (On-site, Bulk, Cylinder)
- 2.2 Regional Market Analysis
 - 2.2.1 North America
 - 2.2.2 Europe
 - 2.2.3 Asia-Pacific
 - 2.2.4 Latin America
 - 2.2.5 Middle East and Africa
- 2.3 Market Drivers and Restraints
- 2.4 Industry Trends and Developments

3 OXYGEN MARKET ANALYSIS

- 3.1 Oxygen Classification and Purity Levels
- 3.2 Main Markets and Typical Levels of Purity
 - 3.2.1 Steelmaking
 - 3.2.2 Chemicals Production
 - 3.2.3 Refining
 - 3.2.4 Glass & Ceramics Production
 - 3.2.5 Water Treatment
 - 3.2.6 Medical Oxygen
 - 3.2.7 Metal Fabrication
 - 3.2.8 Pulp & Paper
 - 3.2.9 Food Industry
- 3.3 Production
 - 3.3.1 Cryogenic air separation
 - 3.3.2 Main domestic US oxygen suppliers
- 3.4 Transportation
 - 3.4.1 Transportation Types
 - 3.4.2 Liquid Oxygen Transport
 - 3.4.3 Rail Transport
 - 3.4.4 Alternative Supply Modes
 - 3.4.5 LOX Transport Economics
 - 3.4.6 Industry Structure
 - 3.4.7 Regulations
 - 3.4.8 Outlook
- 3.5 Storage
- 3.6 Production and Consumption Trends
 - 3.6.1 By Region
 - 3.6.2 By Classification/purity
 - 3.6.3 By Industrial applications
 - 3.6.4 By Production costs
- 3.7 Pricing
 - 3.7.1 By Classification/purity
 - 3.7.2 By Industrial applications
- 3.8 The oxygen economy and production
 - 3.8.1 Dynamics shaping industrial oxygen outlook
 - 3.8.1.1 Steelmaking and Metals
 - 3.8.1.2 Chemicals
 - 3.8.1.3 Refining
 - 3.8.1.4 Glass & Ceramics Production
 - 3.8.1.5 Water treatment

- 3.8.1.6 Medical oxygen
- 3.8.1.7 Pulp & Paper
- 3.8.1.8 Other
- 3.9 Oxygen Market Value Chain
- 3.10 Market Challenges and Opportunities

4 HELIUM MARKET ANALYSIS

- 4.1 Global Helium Resources and Production
 - 4.1.1 Geographical Distribution of Helium Resources
 - 4.1.2 Major Helium Production Sites
 - 4.1.3 Production capacities
 - 4.1.4 Market by applications
- 4.2 Helium Applications
 - 4.2.1 Semiconductor Manufacturing
 - 4.2.2 Magnetic Resonance Imaging (MRI)
 - 4.2.3 Fiber Optic Manufacturing
 - 4.2.4 Aerospace Applications
 - 4.2.5 Welding
 - 4.2.6 Leak Detection and Testing
 - 4.2.7 Lifting Applications
 - 4.2.8 Helium Mass Spectrometry
- 4.3 Pricing and supply
 - 4.3.1 Supply Challenges and Price Volatility
 - 4.3.2 Geopolitical Factors Affecting Supply
 - 4.3.3 Impact of Supply Disruptions on End-Users
- 4.4 Helium Separation Technologies
 - 4.4.1 Cryogenic Distillation
 - 4.4.2 5.4.2 Pressure Swing Adsorption (PSA)
 - 4.4.3 Membrane Separation
- 4.5 Helium Substitutes and Reclamation
 - 4.5.1 Alternative Gases for Various Applications
 - 4.5.2 Helium Recycling and Recovery Systems
 - 4.5.3 Economic and Technical Feasibility of Substitutes

5 NITROGEN MARKET ANALYSIS

- 5.1 Production Methods
 - 5.1.1 Cryogenic Air Separation

- 5.1.2 Pressure Swing Adsorption (PSA)
- 5.1.3 Membrane Separation
- 5.1.4 Comparison of Production Methods
- 5.2 Raw Materials and Input Costs
 - 5.2.1 Supply Chain Analysis
- 5.3 Key Markets and Applications
 - 5.3.1 Food Packaging and Preservation
 - 5.3.2 Chemical and Petroleum Industries
 - 5.3.3 Metal Processing and Fabrication
 - 5.3.4 Electronics Manufacturing
 - 5.3.5 Healthcare and Pharmaceuticals
- 5.4 Other markets
- 5.5 Market Size and Forecast
 - 5.5.1 Historical Market Trends (2015-2024)
 - 5.5.2 Current Market Size (2024)
 - 5.5.3 Market Forecast (2026-2035)
 - 5.5.4 Market Segmentation
 - 5.5.4.1 By Form (Liquid Nitrogen, Compressed Nitrogen Gas)
 - 5.5.4.2 By Grade (High Purity, Ultra-High Purity, Standard)
 - 5.5.4.3 By End-use Industry
 - 5.5.4.4 By Production Method

6 HYDROGEN MARKET ANALYSIS

- 6.1 Hydrogen value chain
 - 6.1.1 Production
 - 6.1.2 Transport and storage
 - 6.1.3 Utilization
- 6.2 National hydrogen initiatives
- 6.3 Global hydrogen production
 - 6.3.1 Industrial applications
 - 6.3.2 Hydrogen energy
 - 6.3.2.1 Stationary use
 - 6.3.2.2 Hydrogen for mobility
 - 6.3.3 Current Annual H₂ Production
 - 6.3.4 Hydrogen production processes
 - 6.3.4.1 Hydrogen as by-product
 - 6.3.4.2 Reforming
 - 6.3.4.2.1 SMR wet method

- 6.3.4.2.2 Oxidation of petroleum fractions
- 6.3.4.2.3 Coal gasification
- 6.3.4.3 Reforming or coal gasification with CO₂ capture and storage
- 6.3.4.4 Steam reforming of biomethane
- 6.3.4.5 Water electrolysis
- 6.3.4.6 The Power-to-Gas" concept
- 6.3.4.7 Fuel cell stack
- 6.3.4.8 Electrolysers
- 6.3.4.9 Other
 - 6.3.4.9.1 Plasma technologies
 - 6.3.4.9.2 Photosynthesis
 - 6.3.4.9.3 Bacterial or biological processes
 - 6.3.4.9.4 Oxidation (biomimicry)
- 6.3.5 Production costs
- 6.4 Green hydrogen
 - 6.4.1 Overview
 - 6.4.2 Role in energy transition
 - 6.4.3 SWOT analysis
 - 6.4.4 Electrolyzer technologies
 - 6.4.4.1 Alkaline water electrolysis (AWE)
 - 6.4.4.2 Anion exchange membrane (AEM) water electrolysis
 - 6.4.4.3 PEM water electrolysis
 - 6.4.4.4 Solid oxide water electrolysis
 - 6.4.5 Market players
- 6.5 Blue hydrogen (low-carbon hydrogen)
 - 6.5.1 Overview
 - 6.5.2 Advantages over green hydrogen
 - 6.5.3 SWOT analysis
 - 6.5.4 Production technologies
 - 6.5.4.1 Steam-methane reforming (SMR)
 - 6.5.4.2 Autothermal reforming (ATR)
 - 6.5.4.3 Partial oxidation (POX)
 - 6.5.4.4 Sorption Enhanced Steam Methane Reforming (SE-SMR)
 - 6.5.4.5 Methane pyrolysis (Turquoise hydrogen)
 - 6.5.4.6 Coal gasification
 - 6.5.4.7 Advanced autothermal gasification (AATG)
 - 6.5.4.8 Biomass processes
 - 6.5.4.9 Microwave technologies
 - 6.5.4.10 Dry reforming
 - 6.5.4.11 Plasma Reforming

- 6.5.4.12 Solar SMR
- 6.5.4.13 Tri-Reforming of Methane
- 6.5.4.14 Membrane-assisted reforming
- 6.5.4.15 Catalytic partial oxidation (CPOX)
- 6.5.4.16 Chemical looping combustion (CLC)
- 6.6 Pink hydrogen
 - 6.6.1 Overview
 - 6.6.2 Production
 - 6.6.3 Applications
 - 6.6.4 SWOT analysis
 - 6.6.5 Market players
- 6.7 Turquoise hydrogen
 - 6.7.1 Overview
 - 6.7.2 Production
 - 6.7.3 Applications
 - 6.7.4 SWOT analysis
 - 6.7.5 Market players
- 6.8 Key Markets and Applications
 - 6.8.1 Hydrogen Fuel Cells
 - 6.8.1.1 Market overview
 - 6.8.1.2 PEM fuel cells (PEMFCs)
 - 6.8.1.3 Solid oxide fuel cells (SOFCs)
 - 6.8.1.4 Alternative fuel cells
 - 6.8.2 Alternative fuel production
 - 6.8.2.1 Solid Biofuels
 - 6.8.2.2 Liquid Biofuels
 - 6.8.2.3 Gaseous Biofuels
 - 6.8.2.4 Conventional Biofuels
 - 6.8.2.5 Advanced Biofuels
 - 6.8.2.6 Feedstocks
 - 6.8.2.7 Production of biodiesel and other biofuels
 - 6.8.2.8 Renewable diesel
 - 6.8.2.9 Biojet and sustainable aviation fuel (SAF)
 - 6.8.2.10 Electrofuels (E-fuels, power-to-gas/liquids/fuels)
 - 6.8.2.10.1 Hydrogen electrolysis
 - 6.8.2.10.2 eFuel production facilities, current and planned
 - 6.8.3 Hydrogen Vehicles
 - 6.8.3.1 Market overview
 - 6.8.4 Aviation

- 6.8.4.1 Market overview
- 6.8.5 Ammonia production
 - 6.8.5.1 Market overview
 - 6.8.5.2 Decarbonisation of ammonia production
 - 6.8.5.3 Green ammonia synthesis methods
 - 6.8.5.3.1 Haber-Bosch process
 - 6.8.5.3.2 Biological nitrogen fixation
 - 6.8.5.3.3 Electrochemical production
 - 6.8.5.3.4 Chemical looping processes
 - 6.8.5.4 Blue ammonia
 - 6.8.5.4.1 Blue ammonia projects
 - 6.8.5.5 Chemical energy storage
 - 6.8.5.5.1 Ammonia fuel cells
 - 6.8.5.5.2 Marine fuel
- 6.8.6 Methanol production
 - 6.8.6.1 Market overview
 - 6.8.6.2 Methanol-to gasoline technology
 - 6.8.6.3 Production processes
 - 6.8.6.3.1 Anaerobic digestion
 - 6.8.6.3.2 Biomass gasification
 - 6.8.6.3.3 Power to Methane
- 6.8.7 Steelmaking
 - 6.8.7.1 Market overview
 - 6.8.7.2 Comparative analysis
 - 6.8.7.3 Hydrogen Direct Reduced Iron (DRI)
- 6.8.8 Power & heat generation
 - 6.8.8.1 Market overview
 - 6.8.8.1.1 Power generation
 - 6.8.8.1.2 Heat Generation
- 6.8.9 Maritime
 - 6.8.9.1 Market overview
- 6.8.10 Fuel cell trains
 - 6.8.10.1 Market overview
 - 6.8.10.2 Market Trends and Forecast
- 6.9 Global hydrogen demand forecasts
 - 6.9.1 Price Trends
 - 6.9.2 Market Outlook (2025-2035)

7 CARBON DIOXIDE MARKET ANALYSIS

- 7.1 Main sources of carbon dioxide emissions
- 7.2 CO₂ as a commodity
 - 7.2.1 Carbon Capture
 - 7.2.1.1 Source Characterization
 - 7.2.1.2 Purification
 - 7.2.1.3 CO₂ capture technologies
 - 7.2.2 Carbon Utilization
 - 7.2.2.1 CO₂ utilization pathways
 - 7.2.3 Carbon storage
 - 7.2.3.1 Passive storage
 - 7.2.3.2 Enhanced oil recovery
- 7.3 CO₂ capture technologies
- 7.4 >90% capture rate
- 7.5 99% capture rate
- 7.6 CO₂ capture from point sources
 - 7.6.1 Energy Availability and Costs
 - 7.6.2 Power plants with CCUS
 - 7.6.3 Transportation
 - 7.6.4 Global point source CO₂ capture capacities
 - 7.6.5 By source
- 7.7 Main carbon capture processes
 - 7.7.1 Materials
 - 7.7.2 Post-combustion
 - 7.7.2.1 Chemicals/Solvents
 - 7.7.2.2 Amine-based post-combustion CO₂ absorption
 - 7.7.2.3 Physical absorption solvents
 - 7.7.3 Oxy-fuel combustion
 - 7.7.3.1 Oxyfuel CCUS cement projects
 - 7.7.3.2 Chemical Looping-Based Capture
 - 7.7.4 Liquid or supercritical CO₂: Allam-Fetvedt Cycle
 - 7.7.5 Pre-combustion
- 7.8 Carbon separation technologies
 - 7.8.1 Absorption capture
 - 7.8.2 Adsorption capture
 - 7.8.2.1 Solid sorbent-based CO₂ separation
 - 7.8.2.2 Metal organic framework (MOF) adsorbents
 - 7.8.2.3 Zeolite-based adsorbents
 - 7.8.2.4 Solid amine-based adsorbents

- 7.8.2.5 Carbon-based adsorbents
- 7.8.2.6 Polymer-based adsorbents
- 7.8.2.7 Solid sorbents in pre-combustion
- 7.8.2.8 Sorption Enhanced Water Gas Shift (SEWGS)
- 7.8.2.9 Solid sorbents in post-combustion
- 7.8.3 Membranes
 - 7.8.3.1 Membrane-based CO₂ separation
 - 7.8.3.2 Post-combustion CO₂ capture
 - 7.8.3.2.1 Facilitated transport membranes
 - 7.8.3.3 Pre-combustion capture
- 7.8.4 Liquid or supercritical CO₂ (Cryogenic) capture
 - 7.8.4.1 Cryogenic CO₂ capture
- 7.8.5 Calcium Looping
 - 7.8.5.1 Calix Advanced Calciner
- 7.8.6 Other technologies
 - 7.8.6.1 LEILAC process
 - 7.8.6.2 CO₂ capture with Solid Oxide Fuel Cells (SOFCs)
 - 7.8.6.3 CO₂ capture with Molten Carbonate Fuel Cells (MCFCs)
 - 7.8.6.4 Microalgae Carbon Capture
- 7.8.7 Comparison of key separation technologies
- 7.8.8 Technology readiness level (TRL) of gas separation technologies
- 7.9 Bioenergy with carbon capture and storage (BECCS)
 - 7.9.1 Overview of technology
 - 7.9.2 Biomass conversion
 - 7.9.3 BECCS facilities
 - 7.9.4 Challenges
- 7.10 Direct air capture (DAC)
 - 7.10.1 Technology description
 - 7.10.1.1 Sorbent-based CO₂ Capture
 - 7.10.1.2 Solvent-based CO₂ Capture
 - 7.10.1.3 DAC Solid Sorbent Swing Adsorption Processes
 - 7.10.1.4 Electro-Swing Adsorption (ESA) of CO₂ for DAC
 - 7.10.1.5 Solid and liquid DAC
 - 7.10.2 Advantages of DAC
 - 7.10.3 Deployment
 - 7.10.4 Point source carbon capture versus Direct Air Capture
 - 7.10.5 Technologies
 - 7.10.5.1 Solid sorbents
 - 7.10.5.2 Liquid sorbents

- 7.10.5.3 Liquid solvents
- 7.10.5.4 Airflow equipment integration
- 7.10.5.5 Passive Direct Air Capture (PDAC)
- 7.10.5.6 Direct conversion
- 7.10.5.7 Co-product generation
- 7.10.5.8 Low Temperature DAC
- 7.10.5.9 Regeneration methods
- 7.10.6 Electricity and Heat Sources
- 7.10.7 Commercialization and plants
- 7.10.8 Metal-organic frameworks (MOFs) in DAC
- 7.10.9 DAC plants and projects-current and planned
- 7.10.10 Capacity forecasts
- 7.10.11 Costs
- 7.10.12 Market challenges for DAC
- 7.10.13 Market prospects for direct air capture
- 7.10.14 Players and production
- 7.11 Global market forecasts
 - 7.11.1 CCUS capture capacity forecast by end point
 - 7.11.2 Capture capacity by region to 2045, Mtpa
 - 7.11.3 Revenues
 - 7.11.4 CCUS capacity forecast by capture type

8 ARGON MARKET ANALYSIS

- 8.1 Overview of Argon
 - 8.1.1 Chemical Properties and Characteristics
 - 8.1.2 Natural Occurrence and Abundance
 - 8.1.3 Importance of Argon in Various Industries
- 8.2 Raw Materials and Input Costs
- 8.3 Global Production Capacity
- 8.4 Supply Chain Analysis
- 8.5 Production Methods
 - 8.5.1 Air Separation Units (ASUs)
 - 8.5.2 Cryogenic Distillation
 - 8.5.3 Pressure Swing Adsorption (PSA)
- 8.6 Key Applications
 - 8.6.1 Metal Production and Fabrication
 - 8.6.2 Welding and Cutting
 - 8.6.3 Electronics and Semiconductor Manufacturing

8.6.4 Lighting Industry

8.6.5 Other markets

8.7 Market Trends and Forecast

8.7.1 Historical Market Trends (2015-2024)

8.7.2 Current Market Size (2025)

8.7.3 Market Forecast (2026-2035)

8.7.4 Market Segmentation

8.7.4.1 By Form (Liquid Argon, Compressed Argon Gas)

8.7.4.2 By Grade (Ultra-High Purity, High Purity, Standard)

8.7.4.3 By End-use Industry.

8.7.4.4 By Production Method

8.7.5 Pricing Analysis

8.7.5.1 Historical Price Trends

8.7.5.2 Current Pricing Patterns

8.7.5.3 Factors Affecting Argon Prices

9 OTHER SPECIALTY GASES MARKET ANALYSIS

10 END-USE INDUSTRY ANALYSIS

10.1 Manufacturing and Metallurgy

10.2 Chemicals and Petrochemicals

10.3 Healthcare and Pharmaceuticals

10.4 Food and Beverage

10.5 Electronics and Semiconductor

10.6 Energy and Power Generation

10.7 Aerospace and Aviation

10.8 Environmental and Water Treatment

10.9 Technology and Innovation

10.9.1 Advancements in Production Technologies

10.9.2 Smart Manufacturing and Industry 4.0 in Gas Production

10.9.3 Digitalization and IoT in Supply Chain Management

10.9.4 Emerging Applications and Novel Uses of Industrial Gases

11 COMPETITIVE LANDSCAPE

11.1 Market Structure and Concentration

11.2 Key Players and Market Share Analysis

11.3 Competitive Strategies

- 11.4 SWOT Analysis of Major Players
- 11.5 Market Dynamics and Trends
 - 11.5.1 Pricing Trends and Factors Affecting Pricing
 - 11.5.2 Supply-Demand Balance and Trade Dynamics
 - 11.5.3 Impact of Energy Prices on Production Costs
- 11.6 Regulatory Environment and Compliance Issues
- 11.7 Sustainability Initiatives in the Industry
- 11.8 Impact of Global Events on the Industrial Gas Market
- 11.9 Future Outlook and Market Forecast
- 11.10 Long-term Market Projections (2025-2035)
- 11.11 Emerging Applications and Potential Game-Changers
- 11.12 Investment Opportunities and Recommendations

12 COMPANY PROFILES 386 (579 COMPANY PROFILES)

13 APPENDIX

- 13.1 RESEARCH METHODOLOGY
- 13.2 Glossary of Terms
- 13.3 12. List of Abbreviations

14 REFERENCES

List Of Tables

LIST OF TABLES

- Table 1. Classification of Industrial Gases.
- Table 2. Other specialty gases.
- Table 3. Key Applications and End-Use Industries.
- Table 4. Comparison of production methods and technologies.
- Table 5. Global Industrial Gas Market Size, by Gas Type (2015-2035).
- Table 6. Global Industrial Gas Market Size, by End-Use Industry (2015-2035)
- Table 7. Industrial Gas Market Size, by Supply Mode (2015-2035).
- Table 8. North America Industrial Gas Market Size, by Type (2015-2035).
- Table 9. Europe Industrial Gas Market Size, by Type (2015-2035).
- Table 10. Asia-Pacific Industrial Gas Market Size, by Type (2015-2035).
- Table 11. Latin America Industrial Gas Market Size, by Type (2015-2035).
- Table 12. Middle East and Africa Industrial Gas Market Size, by Type (2015-2035).
- Table 13. Industrial Gases Market Drivers and Restraints.
- Table 14. Industrial oxygen by purity levels and corresponding applications
- Table 15. Comparison of different oxygen storage mediums.
- Table 16. Global production and consumption of industrial oxygen by region-2020-2035 (million metric tons).
- Table 17. Current and projected annual production of industrial oxygen, by purity, 2019-2035 (million metric tons).
- Table 18. Global industrial oxygen production from 2019-2035 by industrial application area (million metric tons).
- Table 19. Global annual production of industrial oxygen, by production costs, 2019-2035 (million metric tons).
- Table 20. Pricing matrix for commercial oxygen based on purity level and industrial application.
- Table 21. 27 NSF/ANSI Standard 60 Certified suppliers and locations.
- Table 22. Major Global Helium Production Sites.
- Table 23. Global Helium Production Capacity (2005-2023).
- Table 24. Forecast for Yearly Global Helium Production Capacity (2020-2035).
- Table 25. Global helium market by applications 2020-3035.
- Table 26. Comparison of Helium Production Capacity and Demand Forecast (2024-2035).
- Table 27. Demand Trends in Semiconductor Industry.
- Table 28. Historical Price Trends.
- Table 29. Comparison of Helium Separation Technologies.

- Table 30. Technology Readiness of Helium Reclamation in Key Markets.
- Table 31. Global Nitrogen Market 2020-2035, By Form.
- Table 32. Global Nitrogen Market 2020-2035, By Grade (High Purity, Ultra-High Purity, Standard).
- Table 33. Global Nitrogen Market 2020-2035, By End-use Industry.
- Table 34. Global Nitrogen Market 2020-2035, By Production Method.
- Table 35. Hydrogen colour shades, Technology, cost, and CO2 emissions.
- Table 36. National hydrogen initiatives.
- Table 37. Industrial applications of hydrogen.
- Table 38. Hydrogen energy markets and applications.
- Table 39. Hydrogen production processes and stage of development.
- Table 40. Estimated costs of clean hydrogen production.
- Table 41. Characteristics of typical water electrolysis technologies
- Table 42. Advantages and disadvantages of water electrolysis technologies.
- Table 43. Market players in green hydrogen (electrolyzers).
- Table 44. Technology Readiness Levels (TRL) of main production technologies for blue hydrogen.
- Table 45. Key players in methane pyrolysis.
- Table 46. Commercial coal gasifier technologies.
- Table 47. Blue hydrogen projects using CG.
- Table 48. Biomass processes summary, process description and TRL.
- Table 49. Pathways for hydrogen production from biomass.
- Table 50. Market players in pink hydrogen.
- Table 51. Market players in turquoise hydrogen.
- Table 52. Market overview hydrogen fuel cells-applications, market players and market challenges.
- Table 53. Categories and examples of solid biofuel.
- Table 54. Comparison of biofuels and e-fuels to fossil and electricity.
- Table 55. Classification of biomass feedstock.
- Table 56. Biorefinery feedstocks.
- Table 57. Feedstock conversion pathways.
- Table 58. Biodiesel production techniques.
- Table 59. Advantages and disadvantages of biojet fuel
- Table 60. Production pathways for bio-jet fuel.
- Table 61. Applications of e-fuels, by type.
- Table 62. Overview of e-fuels.
- Table 63. Benefits of e-fuels.
- Table 64. eFuel production facilities, current and planned.
- Table 65. Market overview for hydrogen vehicles-applications, market players and

market challenges.

Table 66. Blue ammonia projects.

Table 67. Ammonia fuel cell technologies.

Table 68. Market overview of green ammonia in marine fuel.

Table 69. Summary of marine alternative fuels.

Table 70. Estimated costs for different types of ammonia.

Table 71. Comparison of biogas, biomethane and natural gas.

Table 72. Hydrogen-based steelmaking technologies.

Table 73. Comparison of green steel production technologies.

Table 74. Advantages and disadvantages of each potential hydrogen carrier.

Table 75. Approaches for capturing carbon dioxide (CO₂) from point sources.

Table 76. CO₂ capture technologies.

Table 77. Advantages and challenges of carbon capture technologies.

Table 78. Overview of commercial materials and processes utilized in carbon capture.

Table 79. Comparison of CO₂ capture technologies.

Table 80. Typical conditions and performance for different capture technologies.

Table 81. PSCC technologies.

Table 82. Point source examples.

Table 83. Comparison of point-source CO₂ capture systems

Table 84. Assessment of carbon capture materials

Table 85. Chemical solvents used in post-combustion.

Table 86. Comparison of key chemical solvent-based systems.

Table 87. Chemical absorption solvents used in current operational CCUS point-source projects.

Table 88. Comparison of key physical absorption solvents.

Table 89. Physical solvents used in current operational CCUS point-source projects.

Table 90. Emerging solvents for carbon capture

Table 91. Oxygen separation technologies for oxy-fuel combustion.

Table 92. Large-scale oxyfuel CCUS cement projects.

Table 93. Commercially available physical solvents for pre-combustion carbon capture.

Table 94. Main capture processes and their separation technologies.

Table 95. Absorption methods for CO₂ capture overview.

Table 96. Commercially available physical solvents used in CO₂ absorption.

Table 97. Adsorption methods for CO₂ capture overview.

Table 98. Solid sorbents explored for carbon capture.

Table 99. Carbon-based adsorbents for CO₂ capture.

Table 100. Polymer-based adsorbents.

Table 101. Solid sorbents for post-combustion CO₂ capture.

Table 102. Emerging Solid Sorbent Systems.

- Table 103. Membrane-based methods for CO₂ capture overview.
- Table 104. Comparison of membrane materials for CCUS
- Table 105. Commercial status of membranes in carbon capture
- Table 106. Membranes for pre-combustion capture.
- Table 107. Status of cryogenic CO₂ capture technologies.
- Table 108. Benefits and drawbacks of microalgae carbon capture.
- Table 109. Comparison of main separation technologies.
- Table 110. Technology readiness level (TRL) of gas separation technologies
- Table 111. Existing and planned capacity for sequestration of biogenic carbon.
- Table 112. Existing facilities with capture and/or geologic sequestration of biogenic CO₂.
- Table 113. DAC technologies.
- Table 114. Advantages and disadvantages of DAC.
- Table 115. Advantages of DAC as a CO₂ removal strategy.
- Table 116. Companies developing airflow equipment integration with DAC.
- Table 117. Companies developing Passive Direct Air Capture (PDAC) technologies.
- Table 118. Companies developing regeneration methods for DAC technologies.
- Table 119. DAC companies and technologies.
- Table 120. DAC technology developers and production.
- Table 121. DAC projects in development.

I would like to order

Product name: The Global Market for Industrial Gases 2025-2035 (Oxygen, Nitrogen, Hydrogen, Helium, Carbon Dioxide, Argon, Other Types)

Product link: <https://marketpublishers.com/r/G7312CD9D027EN.html>

Price: US\$ 1,900.00 (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/G7312CD9D027EN.html>

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:
Last name:
Email:
Company:
Address:
City:
Zip code:
Country:
Tel:
Fax:
Your message:

****All fields are required**

Customer signature _____

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at <https://marketpublishers.com/docs/terms.html>

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970

