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# Industrial Gases

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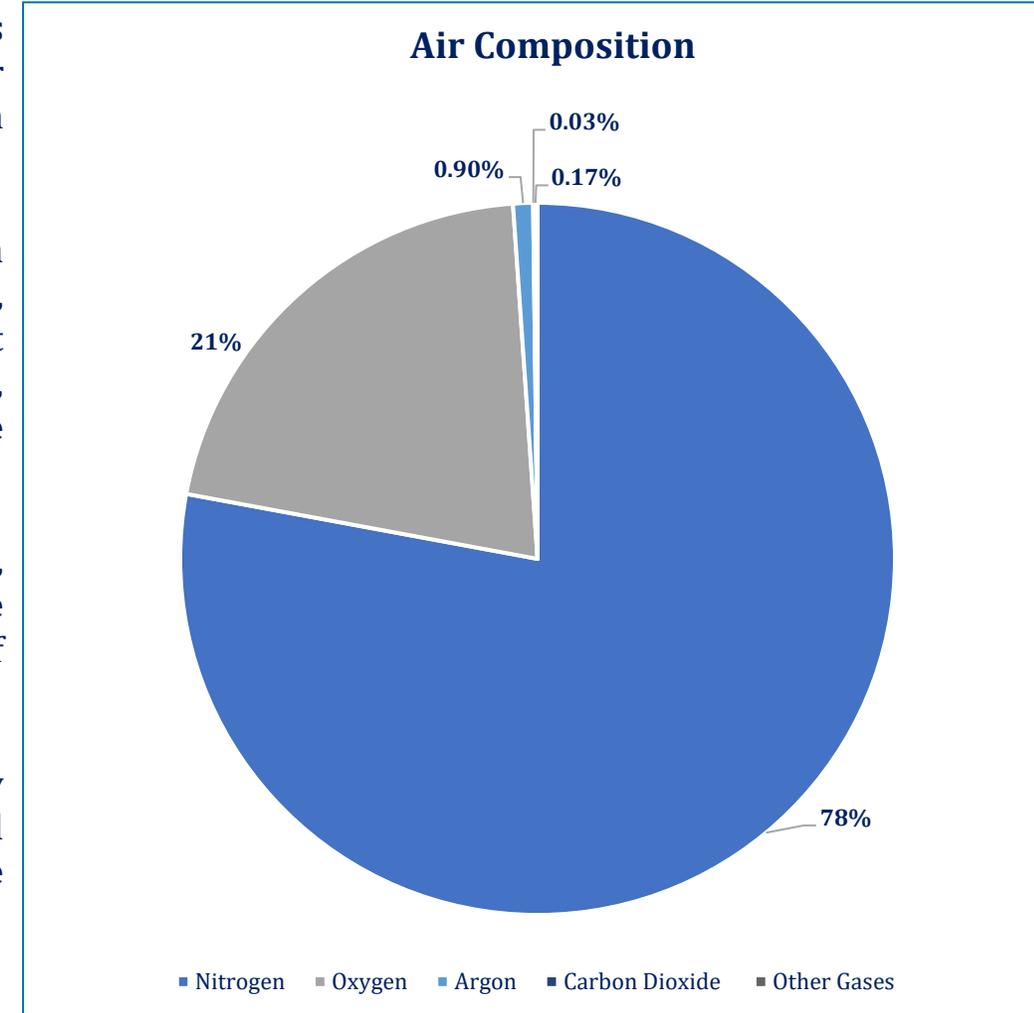
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# Industrial Gases

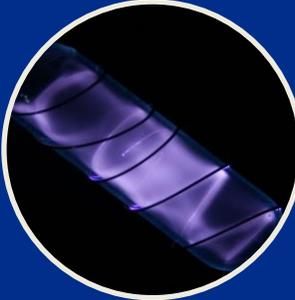
## Introduction

- Industrial Gases are gaseous materials which are manufactured for use in various industries, such as cement, steel, food industry as well as health care and other areas. The main gases are nitrogen, oxygen, carbon dioxide, argon, hydrogen, helium and acetylene which are used in both liquid and gaseous forms.
- Industrial Gases are mostly part of the specialty chemicals industry and are used in a great range of industrial applications like medical gases, cutting and welding, refrigeration or food processing and packaging. Depending on their use in different sectors, these gases are also known as fuel gases, medical gases, refrigerant gases, and specialty gases. Steel, glass, oil, and fiber optics segments demand intensive usage of Industrial Gases.
- Different methods are used to obtain the wide variety of Industrial Gases. Nitrogen, oxygen and argon are obtained from air by fractional distillation, hydrogen is made by the electrolysis of water, carbon dioxide is produced by the steam reforming of methane while Acetylene is made by the reaction of calcium carbide with water.
- The Sector's growth is primarily attributed to the growing manufacturing industry across the globe. Ongoing investments in large-scale infrastructure projects and investments in core industrial segments of the economy are expected to drive demand for Industrial Gases in the medium term.



# Industrial Gases

## Introduction

 <p><b><u>Oxygen</u></b></p> <ul style="list-style-type: none"> <li>• Medical, Chemical processing, General engineering, Fabrication, Steel manufacturing, Welding industries, Ship breaking industry, Oxidation, Pulp and Paper industry</li> </ul>	 <p><b><u>Nitrogen</u></b></p> <ul style="list-style-type: none"> <li>• Chemical processes, oil and gas exploration, Blanketing, Healthcare applications, Food freezing/storage</li> </ul>	 <p><b><u>Argon</u></b></p> <ul style="list-style-type: none"> <li>• Healthcare applications, Deep sea environments, Welding, Food and drink, Cinematography, Lighting</li> </ul>	 <p><b><u>Carbon Dioxide</u></b></p> <ul style="list-style-type: none"> <li>• Refrigerant, Fire extinguishers, Greenhouses, Chemicals, Pharmaceuticals, Metal industry</li> </ul>	 <p><b><u>Hydrogen</u></b></p> <ul style="list-style-type: none"> <li>• Commercial fixation of nitrogen from air, Hydrocracking, Rocket fuel, Welding, Production of hydrochloric acid, Reduction of metallic ores, Filling balloons</li> </ul>	 <p><b><u>Helium</u></b></p> <ul style="list-style-type: none"> <li>• Magnetic Resonance Imaging (MRI), Fiber Optics, Balloon Filling, Deep Sea Diving, Space Exploration, Leak Detection</li> </ul>	 <p><b><u>Rare Gases</u></b> <i>(<u>Neon/Krypton/Xenon</u>)</i></p> <ul style="list-style-type: none"> <li>• Electronics, Media, Healthcare</li> </ul>
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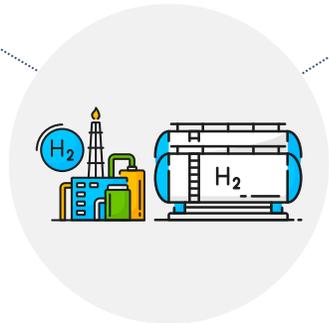
# Industrial Gases

## Supply Chain



### Production

Extraction of gas from the raw materials – air, through electrolysis, reforming, and other techniques.



### Storage

Storing the gas in gaseous, liquefied, slush/solid form to be delivered to the consumers.



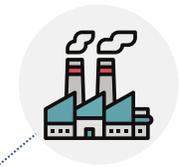
### Distribution

Transmitting the product to the industries and end consumers via methods including On-site/pipeline, Bulk/merchant, Cylinder/packaged techniques.

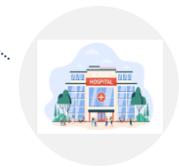


### Utilization

Industrial Gases are used in all the sectors and industries depending upon the nature of the gas.



### Industries

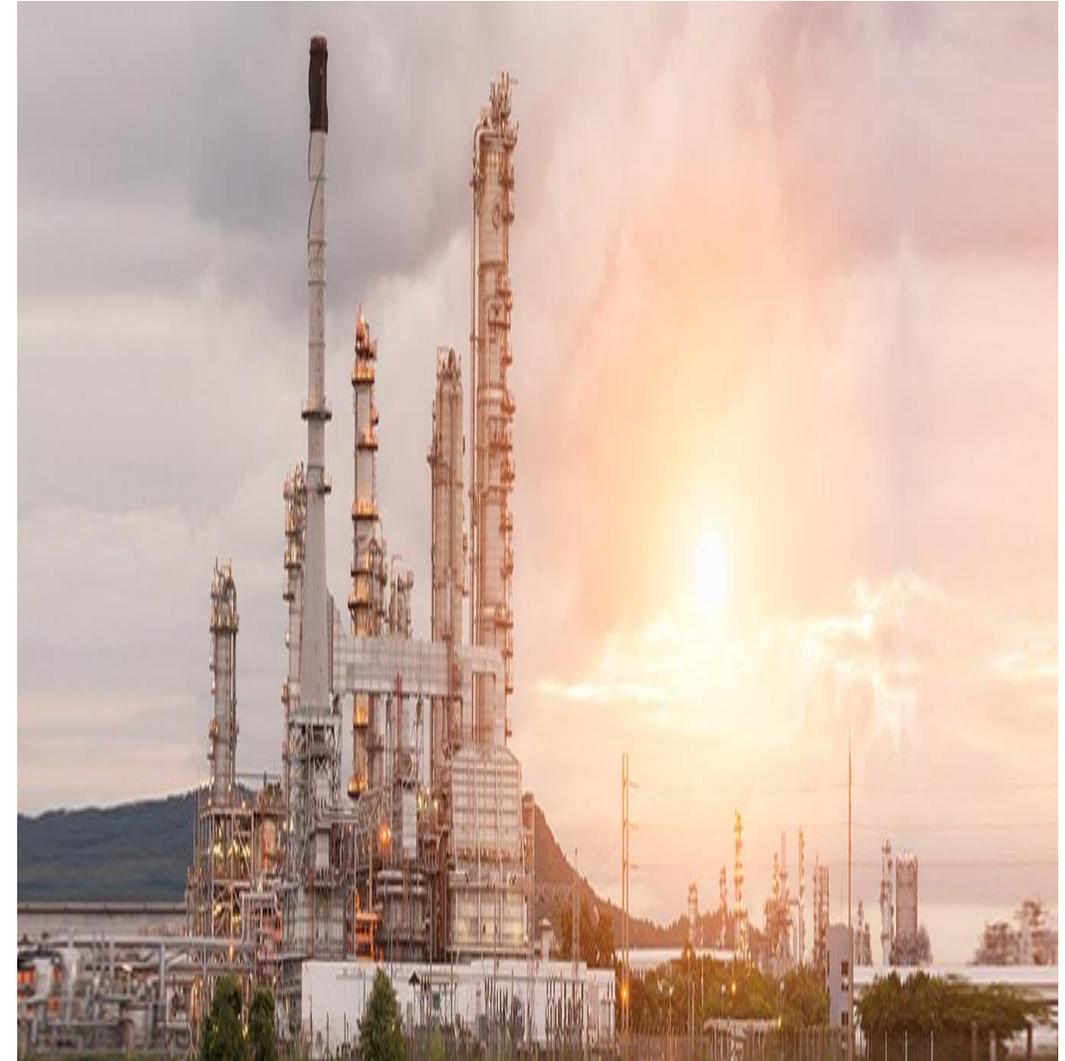


### Healthcare

# Industrial Gases

## Global | Overview

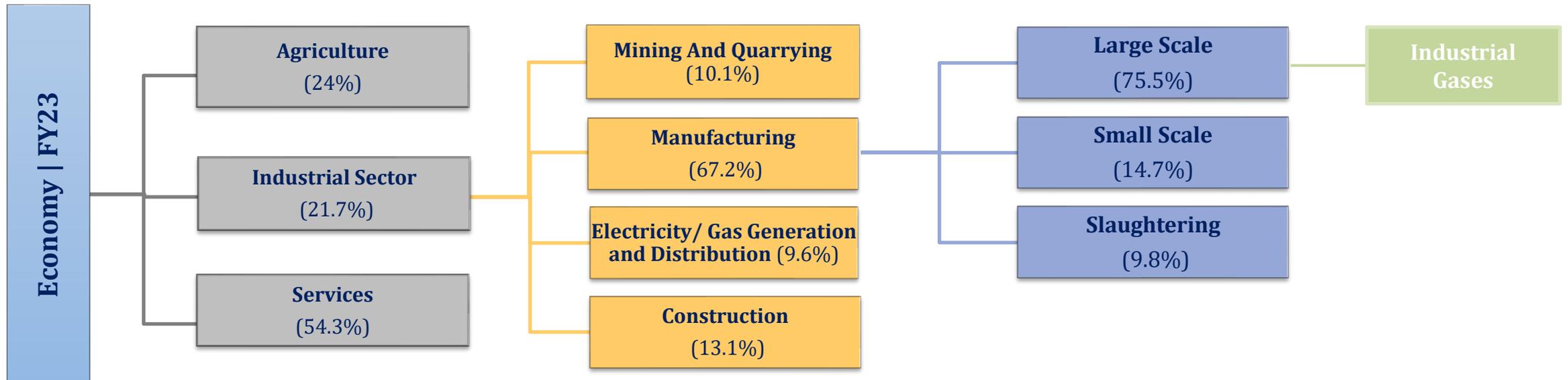
- **Market Size:** The global market size of Industrial Gases has grown from USD~93.7bln in CY21 to USD~99.4bln in CY22, at the rate of ~6% YoY, while it is expected to expand at a CAGR of ~5.2% during the forecast period of CY22-28, increasing from USD~99.4bln in CY22 to USD~134.4bln in CY28.
- **Regions:** The market's presence across different regions includes North America, Europe, Asia Pacific, Latin America and the Middle East and Africa. It is anticipated to gain momentum in the Asia Pacific owing to the increasing urbanization and industrialization. China, India, Japan and Indonesia, among others, are looking forward to investing in sustainable energy development.
- **Demand:** The rising application of Industrial Gases in various end-use industries such as metallurgy, healthcare, food and beverage, oil & gas and power contribute to Sector's overall demand.
- **Supply:** The market is thriving with increased industrial gas usage in Sectors spanning construction, metals, mining, and food services. Moreover, the surging global demand for electronic devices and renewable energy sources is amplifying this growth trajectory.
- **Major Players:** The Industrial Gas market is consolidated and globalized in nature. It is dominated by a few major players including Air Liquide, Messer Group GmbH, Linde PLC, and Air Products Inc., among others.



# Industrial Gases

## Local | Overview

- In FY23, Pakistan’s GDP (nominal) stood at PKR~79.3trn (FY22: PKR~63.3trn) and posted a growth in real terms of ~0.29% (FY22: ~6.1%). Industrial activities in FY23 represented ~21.7% share of the GDP.
- Pakistan’s economy is classified into three main Sectors: Agriculture, Industrial Sector and Services. Large Scale Manufacturing (LSM) in Pakistan is essential for the economic growth, considering its linkages with other Sectors, as it represents ~75.6% value of all manufacturing activities in FY23. The QIM dipped by ~10.3% during FY23 when compared with the same period of the last year (SPLY). In 2MFY24, LSM has shown positive growth, hovering ~0.5%.
- The Sector can be classified under the Large Scale Manufacturing (LSM) component within the country’s industrial segment. During FY23, the Sector's market capitalization stood at PKR~11bln.



# Industrial Gases

## Local | Overview

- The Sector’s revenue is recorded at PKR~18bln in FY23 – a growth of ~11% YoY basis. The Sector has a high dependency on the performance of LSM (Negative growth of ~10.3%) and since there is an overall slowdown in the economic growth, the Sector is also going through to slower growth as compared to the last two years.
- The Sector’s growth remained impressive in FY21, as the economy had gradually, though not fully, recovered from the COVID-19 pandemic and the economic activity revived. In FY22, the country was severely affected by imposition of import restrictions (May’22-Jun’23), flash floods (Aug’22), and political turmoil (4QFY23), leading to high inflationary levels as well as slowdown of numerous industries.
- Pakistan's overall production capacity for Industrial Gases stands at ~1,300TPD. The structure of the Sector is organized and concentrated within two major players, i.e., Pakistan Oxygen Limited and Ghani Chemicals Limited are estimated to have ~74% share of the market in FY23. Other companies include Multan Gases, Sharif Gases, Agha Gas, Sultan Oxygen and MediGas.
- The Sector is likely to undergo expansion plans (covered later) to meet the growing demand of Industrial Gases, particularly of oxygen and nitrogen, in the country.

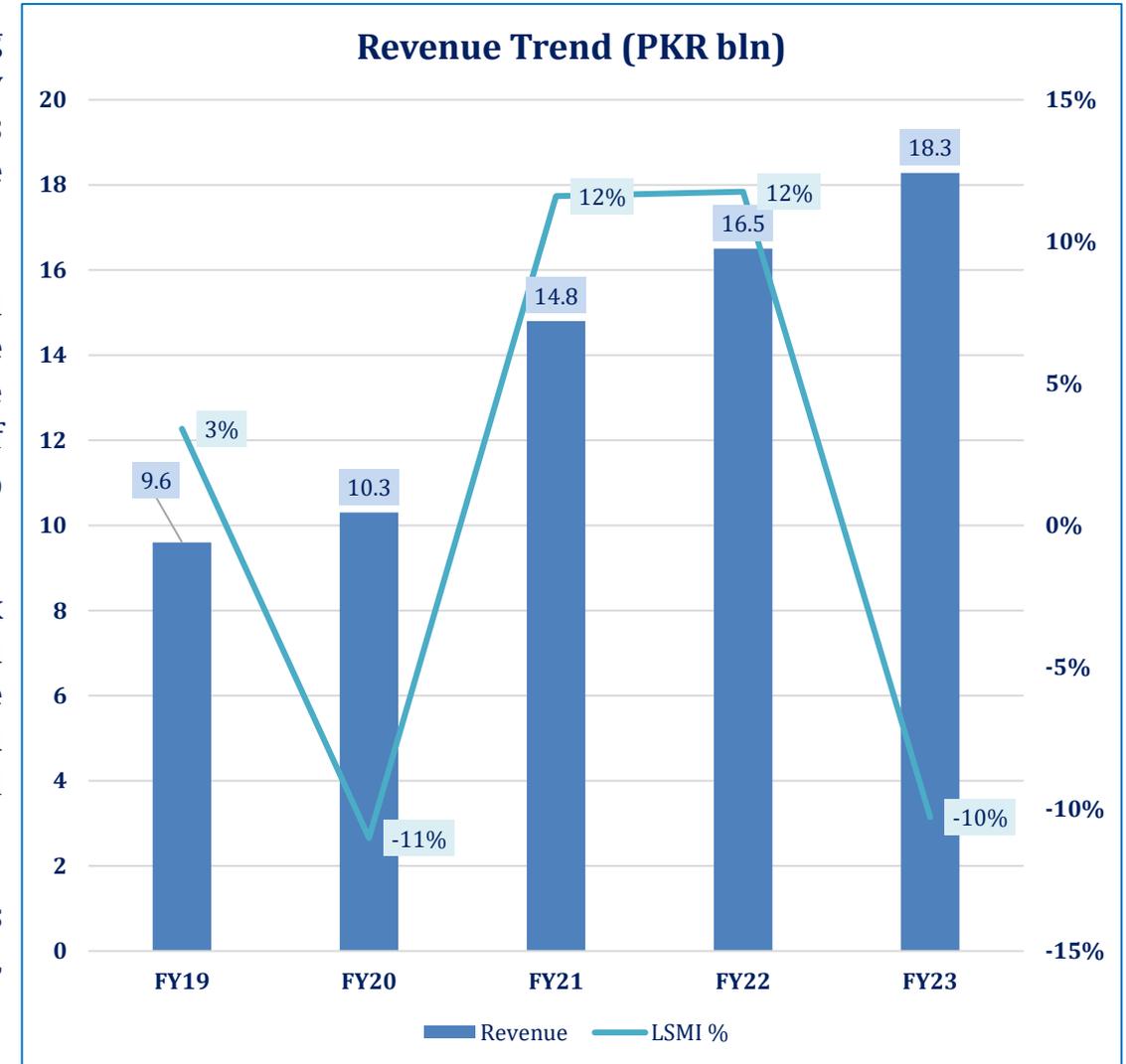
Industry Snapshot	FY21	FY22	FY23*
<b>Est. Revenue (PKR mln)*</b>	14,767	16,513	18,277
<b>YoY Growth (%)</b>	43%	12%	11%
<b>Sector Players</b>	2 players contributing ~74% to the market share.		
<b>Market Structure</b>	Duopoly		
<b>Regulatory Body</b>	Securities and Exchange Commission of Pakistan		

\*Figures are estimated based on PACRA-rated clients.

# Industrial Gases

## Local | Demand

- Major demand of the Sector emanates from the Large-Scale Manufacturing (LSM) as well as the health care segments of the economy. Thus, any fluctuations in LSM growth is likely to have a direct impact on the Sector's revenue. However, demand from health care segment can also determine the trend in Sector's performance.
- In FY23, economic slowdown due to vulnerabilities on the economic and political front impacted a large number of industries including those driving the demand for Industrial Gases. The demand is, however, expected to increase ahead on the back of cessation of import restrictions and strengthening of rupee against dollar. During 4MFY24, the PKR has appreciated by ~1.5% compared against Jun'23.
- The use of Industrial Gases in the manufacturing segment experienced a slack due to import restrictions imposed during May'22-Jun'23. However, demand from this segment is expected to rebound as administrative measures have been implemented to stabilize the economy. In 2MFY24, the LSM recorded positive growth of ~0.5%, signaling slight recovery in country's industrial segment.
- Therefore, the medium and long-term demand for the Sector is likely grow as these Gases are used in several significant Sectors of the economy like steel, cement, food industry and other manufacturing Sectors.



*Note: FY23 numbers are prorated based on latest available quarterly accounts.*

# Industrial Gases

## Local | Supply

- For almost all Industrial Gases, production is derived from the underlying demand. It follows from this that variation in utilization levels across the years is attributable to demand. Underutilization of capacity is likely attributable to certain factors including non-availability of natural gas, lower demand and load-shedding of electricity.
- Moreover, the Sector players are expanding the capacity/plants in different areas including Port Qasim, Karachi and KPK. The added capacity is likely to ensure consistent supply of gases for the industrial requirements of the health Sector, CPEC projects and growth in other Sectors in the LSM. During Jul'22, one of the major Sector players set up 100TPD ASU plant for manufacturing of Oxygen and Nitrogen gases at Port Qasim, Karachi and is now planning to set up 5th ASU plant as well as import substitute chemical project in Hattar Special Economic Zone.

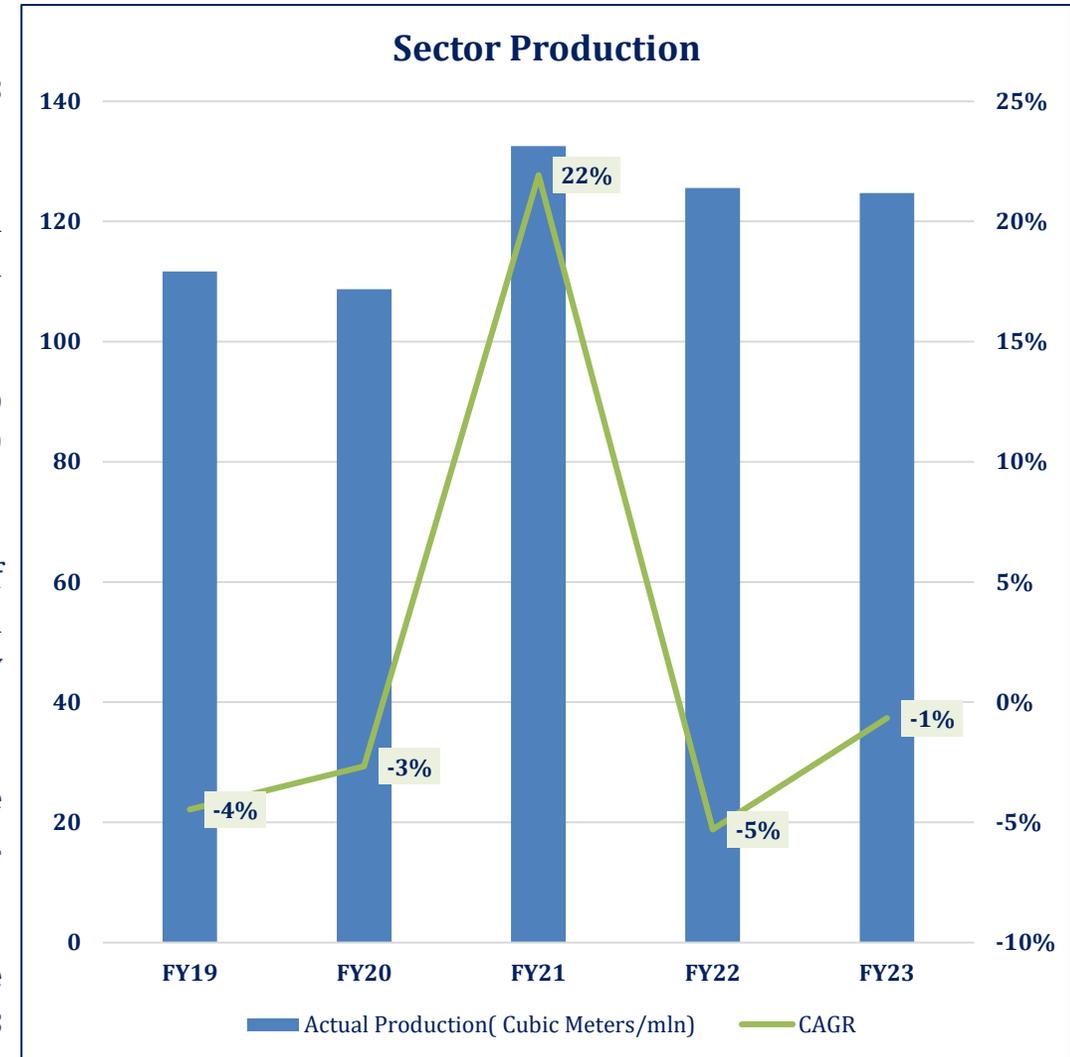
Year	Pakistan Oxygen Limited (CY)			Ghani Chemicals Industry Limited (FY)			Sector Total		
	Production Capacity (Cubic Meters/mln)	Actual Production (Cubic Meters/mln)	Capacity Utilization	Production Capacity (Cubic Meters/mln)	Actual Production (Cubic Meters/mln)	Capacity Utilization	Production Capacity (Cubic Meters/mln)	Actual Production (Cubic Meters/mln)	Capacity Utilization
2017	101.2	70.9	70%	45.8	33.5	73%	147.0	104.4	71%
2018	101.2	71.0	70%	45.8	45.9	100%	147.0	116.9	80%
2019	101.2	68.6	68%	45.8	43.1	94%	147.0	111.7	76%
2020	101.2	64.6	64%	61.0	44.1	72%	162.2	108.7	67%
2021	101.2	70.8	70%	70.8	61.8	87%	172.1	132.6	77%
2022	103.8	66.2	68%	72.7	59.3	82%	176.5	125.5	71%
2023*	103.8	66.2	68%	90.9	58.5	64%	194.7	124.7	64%

\*Actual and estimated production of FY23 for Pakistan Oxygen Limited reflects CY22 data.

# Industrial Gases

## Local | Supply

- In FY23, the actual production capacity of the Sector recorded at ~125mln (FY22: ~126mln), out of which Pakistan Oxygen contributed ~53% and Ghani Chemicals contributed ~47% (covered earlier).
- The production in FY23 witnessed a decline of ~1% despite demand of oxygen in health Sector. This likely resulted from a slowdown in economy's industrial segment.
- The capacity production has been increased at the rate of ~10% in FY23 due to the expansion plans by the players. During Jul'22, Ghani Chemicals setup 100TPD ASU plant for manufacturing of Oxygen and Nitrogen gases at Port Qasim, Karachi.
- The expansion plans of the major players will increase the production capacity of the Sector which can increase the availability of medical gases for hospitals and can also help in developmental projects of CPEC in the future as the economy starts recovering.
- The setup of 5th ASU plant and an import substitute chemical project of one of the major Sector players in Hattar Special Economic Zone are actively in process. These projects are expected to be in operation during 1QFY24..
- The share of import of Industrial Gases has been insignificant as compared to the domestic production. Even though the amount has increased over the years it's share in total supply still remains below ~1%.



**Note:** Figures for FY23 are estimated based on PACRA rated clients.

# Industrial Gases

## Business Risk | Price Determinants

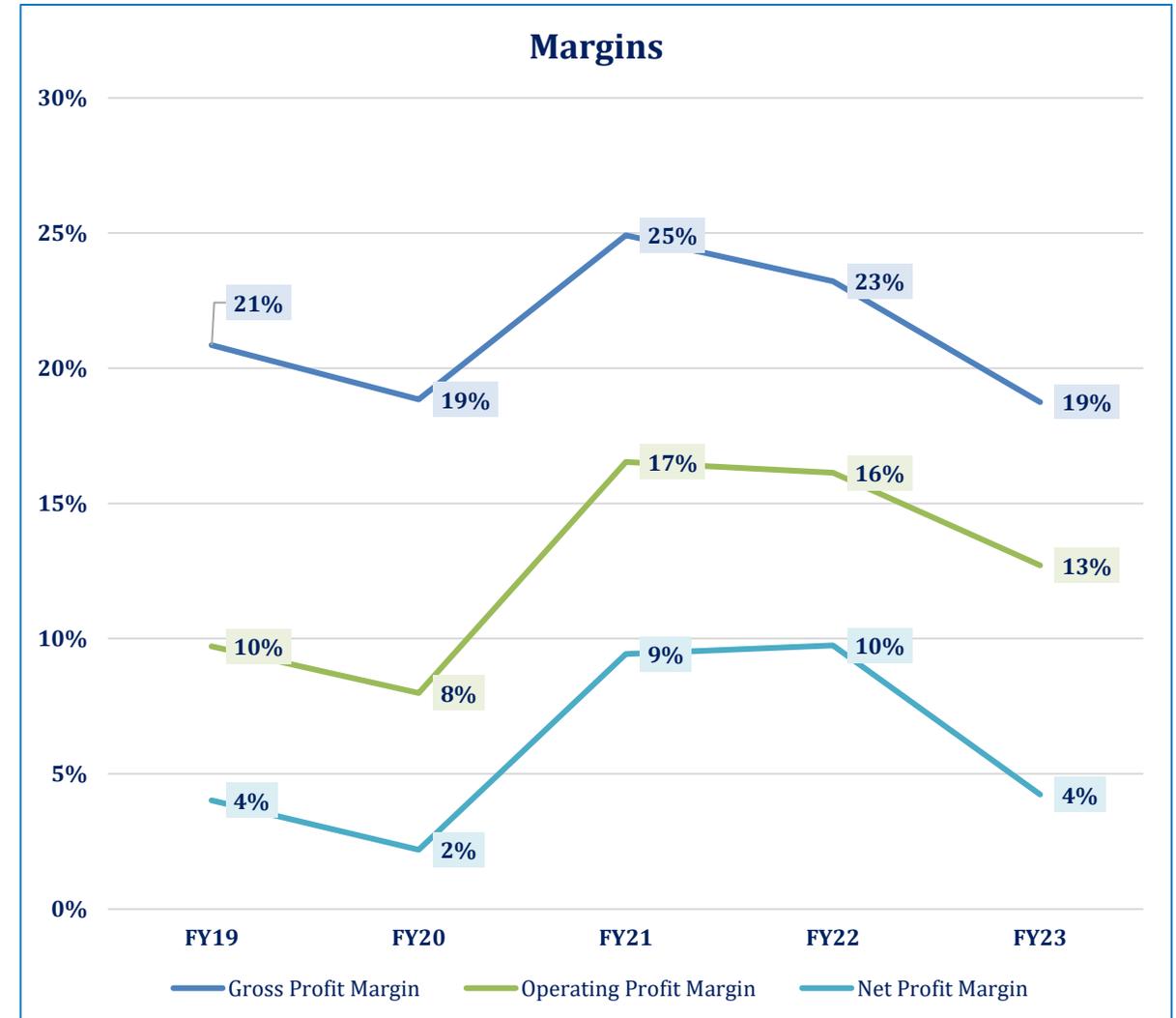
- Prices of Industrial Gases are mainly dependent on the market forces. An increase in the amount of any price determinants can increase overall cost and hence have an impact on the price. Some of the key contributors are listed below:
- Energy Cost:** Electricity is the main source of energy involved in the separation of air and thus drives the cost of production of Industrial Gases. Large scale production has advantage over smaller units as smaller units have higher specific electricity consumption.
- Oil & Natural Gas Price Fluctuation:** For gases like hydrogen and helium, feedstock cost fluctuations have larger impact on the production cost.
- Quality/Special Gas:** If the composition of gas requirement is proprietary, the costs are generally very high. The requirement of high-quality gas also drives the cost and thus the price. Low quality gas and general gases carry lesser cost due to abundant availability of multiple sources of supply. Further, gases are often based and priced on their purity levels.
- Customized Product:** Complex design, specific gas products are tailor-made, which involves high value of production. This increases the prices of such products as their availability is through selected channels.
- Other** price determinants include administrative costs and frequency/ volume of purchase. The Sector is largely able to pass on its cost of production to the end users.



# Industrial Gases

## Business Risk | Margins

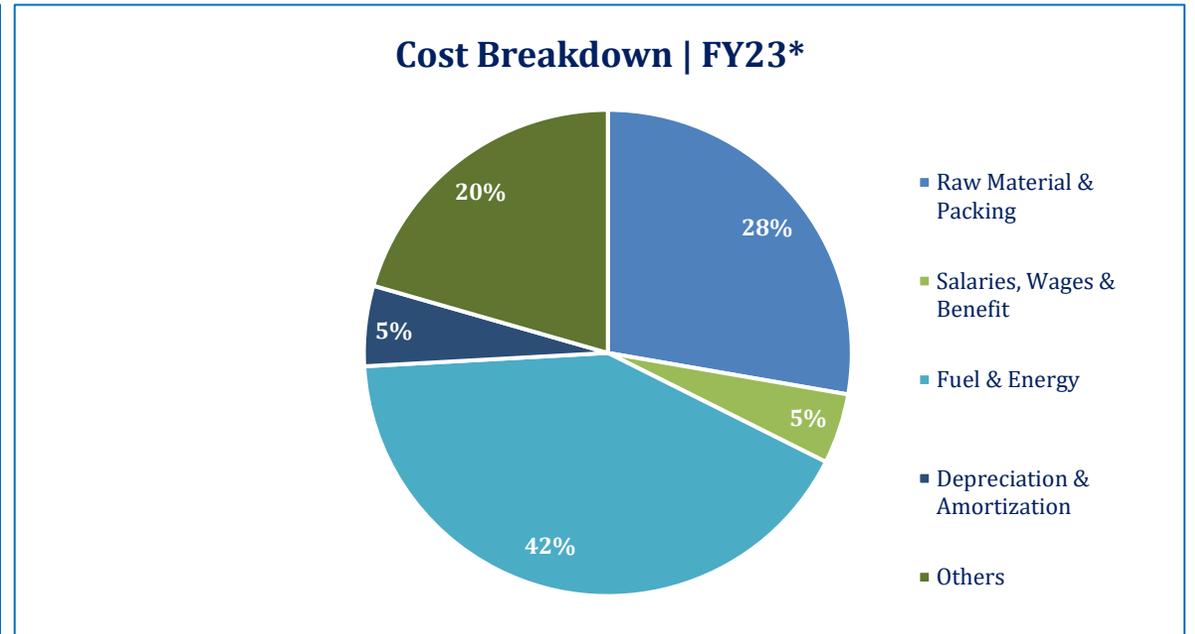
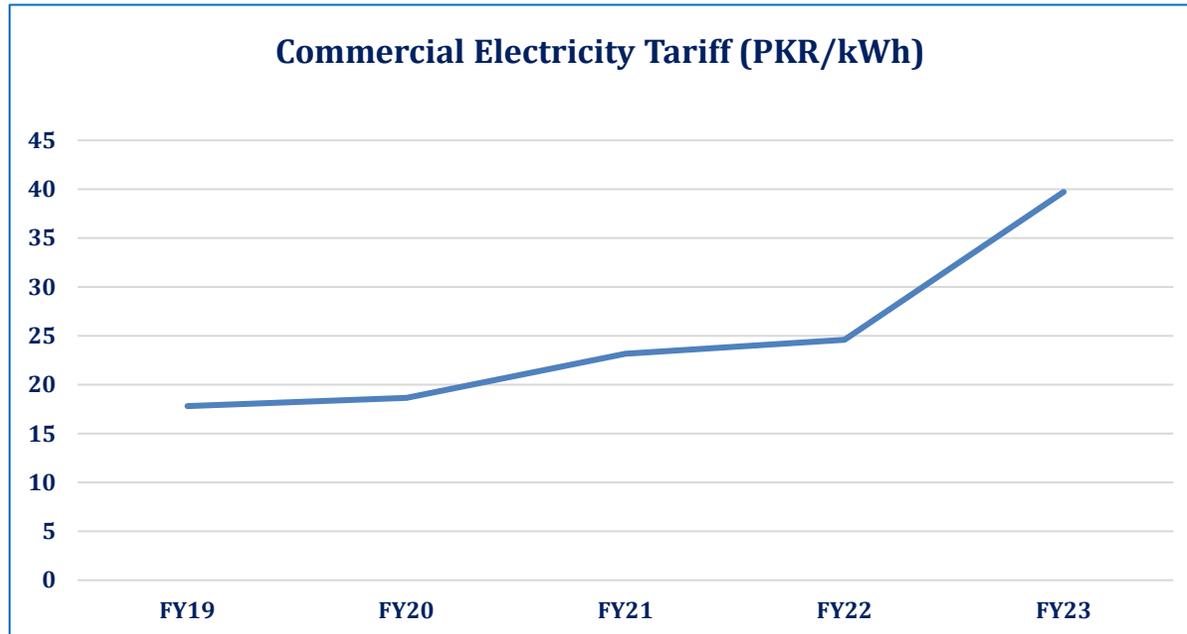
- The Sector's average gross margins for the period from FY19-23 hovered around ~21%. However, in FY23, the average gross margin recorded at ~19%, exhibiting a decline from the corresponding period last year when it recorded at ~23%.
- This reduction can be attributed to a notable increase of ~9% in the average cost of goods sold, which outpace the Sector's revenue growth rate (recorded a moderate rise of ~3% YoY). Consequently, this has led to a decline of ~17% YoY in average gross margin compared to FY22. This reduction is primarily attributable rising costs on account of energy tariff and ~39% PKR devaluation.
- The average operating margins of the Sector during the last five years (FY19-23) were recorded at ~13%. Average operating margins were lower as compared to the previous year at ~13% during FY23 (FY22: ~16%).
- Meanwhile, average net margins during the same period (FY19-23) hovered around ~6%. During FY23, the net margins too declined sharply at ~4% (FY22:~10%). Finance cost was up ~60% YoY due to an increase in policy rate from ~17% to ~22% in FY23. The retrospective imposition of ~4% super tax also adversely impacted profitability of the Sector.



# Industrial Gases

## Business Risk

- Major price drivers for the Sector are energy cost, gas purity, customization of the product, volume purchased, and delivery location, while production is entirely demand-driven. The cost structure of the Industrial Gases comprises ~75-80% variable cost, which includes cost of raw material and fuel & energy. Electricity cost accounted for ~42% in FY23 (SPLY: ~38%), therefore the Sector’s performance remains subject to changes in electricity tariffs. It is followed by the cost of Raw Material that accounted for ~28% in FY23.
- The commercial electricity tariffs sharply increased in FY23 with ~60% growth YoY and stand at PKR~40/kWh (SPLY: PKR~25/kWh).

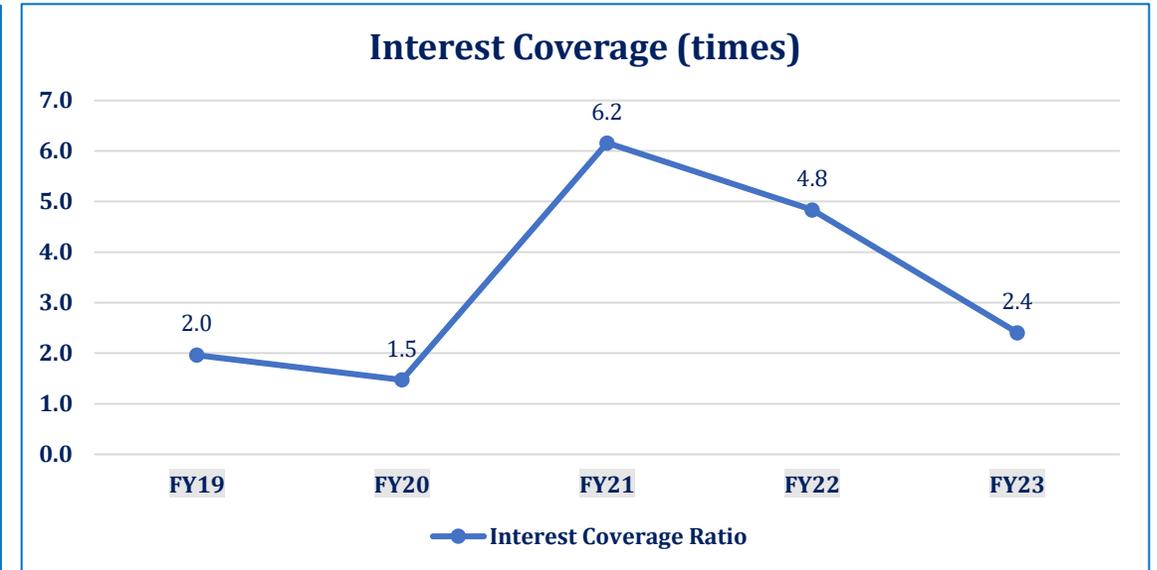
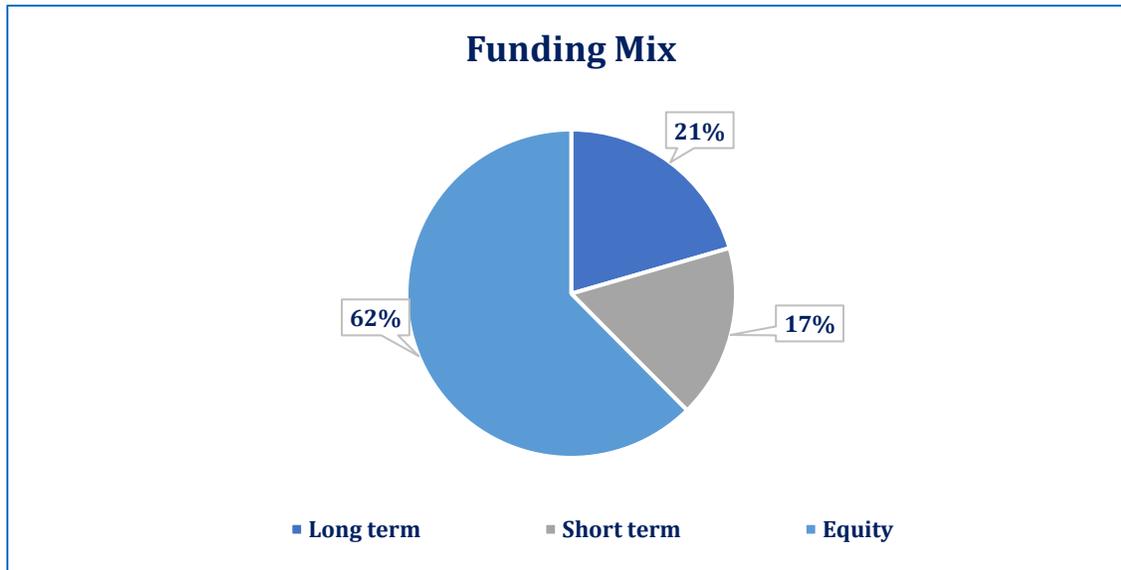


\*Figures for FY23 are estimated based on PACRA rated clients. **Note:** Electricity Tariff does not include FCA and other charges.

# Industrial Gases

## Financial Risk

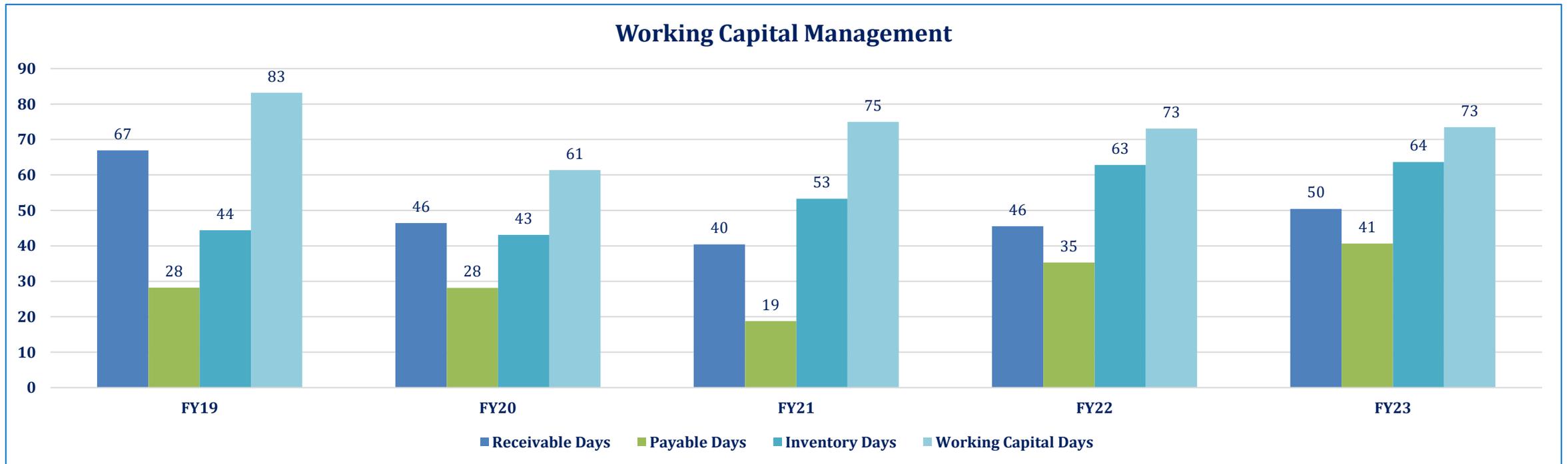
- Leverage:** The Sector is considerably leveraged with debt-to-equity ratio averaging around ~50% (from FY19-FY22), which remains stable in FY23 at ~60% (FY22: ~60%). A higher debt-to-equity ratio indicates increased borrowing, likely on the back of Sector players' expansion plans in order to meet the rising demand for Industrial Gases.
- Funding Mix:** The Sector's total borrowing stood at PKR~10,013mln in FY23 (FY22: PKR~9,389mln), an increase of ~6.6% YoY. The increase in borrowings reflects the pattern of expansion plans of one of the leading players of the Sector. The largest component in borrowing mix is represented by long-term borrowings which made up ~55% of total borrowings in FY23 (FY22: ~58%), while the short-term borrowings constituted ~45% (FY22: ~42%) while the Equity stands at PKR~16,628mln which is ~62% of the total funding mix with an increase of ~8% YoY growth.
- Interest Cover:** The average interest cover of the Sector was recorded ~3.7 (FY18-22), which is greater than that of FY23, which stood at ~2.4times. With decrease in profitability of the Sector, the interest coverage ratio is also decreased from the previous years due to higher interest costs. The interest expense stood at ~68% of the profits before tax in FY23 (FY22: ~26%).



# Industrial Gases

## Financial Risk | Working Capital Management

- The Sector's Working Capital (WC) requirement emanates from financing inventories and trade receivables for which the Sector relies on both internal cash flows and conventionally short-term borrowing.
- During FY23, the country's healthcare Sector experienced steady growth, becoming one of the largest in terms of oxygen consumption. However, the industrial segment experienced a significant decline during FY23, with LSMI shrinking by ~10.3% YoY, due to which the Sector's topline remained stable and so did its Working Capital Cycle. No significant changes were witnessed in any component of the Working Capital days.



*Note: Figures for FY23 are estimated based on PACRA-rated clients.*

# Industrial Gases

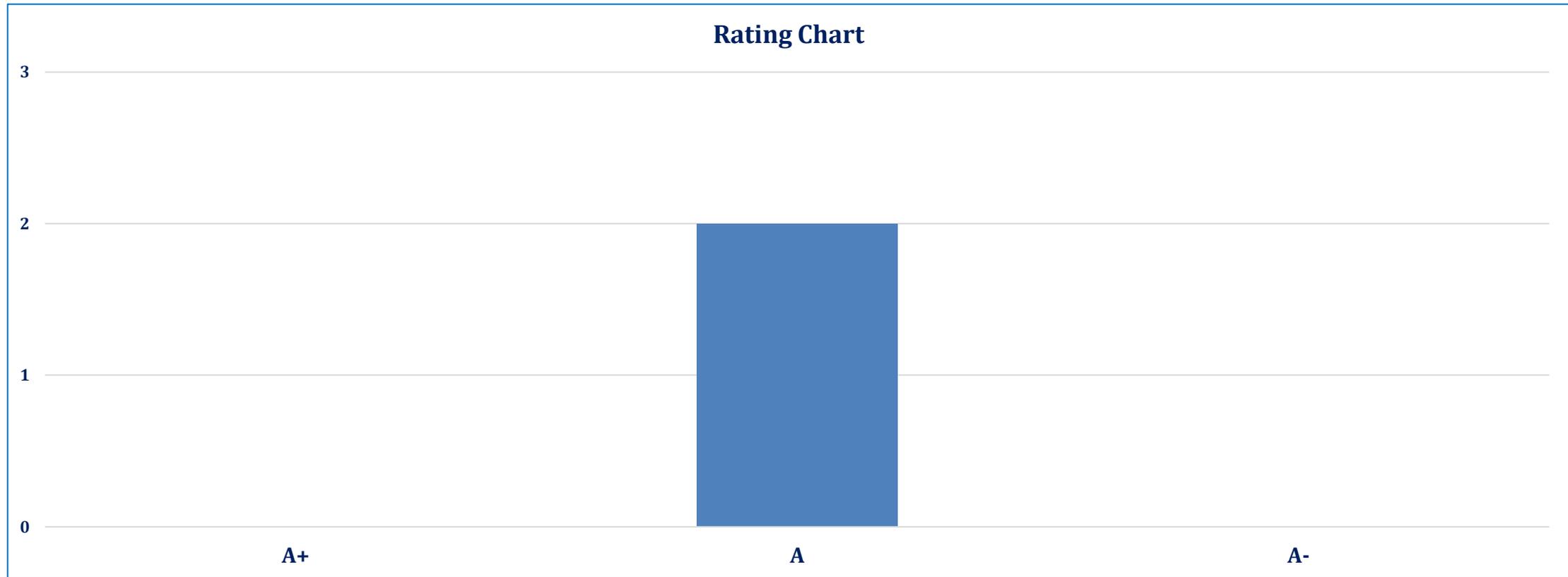
## Regulatory Framework

PCT Code	Description	Custom Duty		Additional Custom Duty		Regulatory Duty		Total	
		FY23	FY24	FY23	FY24	FY23	FY24	FY23	FY24
2804.1000	Hydrogen	3%	3%	2%	2%	0%	0%	5%	5%
2804.2100	Argon	3%	3%	2%	2%	10%	10%	15%	15%
2804.3000	Nitrogen	3%	3%	2%	2%	10%	10%	15%	15%
2804.4000	Oxygen	3%	3%	2%	2%	0%	0%	5%	5%
3824.9996	Neon	0%	0%	2%	2%	0%	0%	2%	2%
2811.2100	Carbon Dioxide	3%	3%	2%	2%	5%	5%	10%	10%
2814.1000	Anhydrous Ammonia	0%	0%	2%	2%	0%	0%	2%	2%
8405.1000	Acetylene	0%	0%	2%	2%	0%	0%	2%	2%
2804.2900	Other	3%	3%	2%	2%	0%	0%	5%	5%

# Industrial Gases

## Rating Curve

- PACRA rates 2 clients in the Industrial Gases Sector, with long-term rating of A.



# Industrial Gases

## SWOT

- Ease of access to raw material
- Mature and long-standing Sector
- Technologically advanced machinery with low power consumption
- By products of the gas production process can be sold separately.
- High barriers to entry.

- Imported machinery
- Low value addition/commodity product
- Highly volatile cost of production
- Energy disruptions
- Dependent on imports effected by dollar rates



- Duopoly structure – price influenced by two major players
- Interdependency on demand from other Industrial Sectors.
- Economic slowdown.
- Non-availability of natural gas

- Growing industrial and medical Sector.
- Rapid industrialization in emerging economies.
- Increased ESG measures and Environment regulations after Paris agreement.
- Opportunity to increase efficiency through technological upgrade.

# Industrial Gases

## Outlook: Stable

- In FY23, Pakistan's GDP (nominal) stood at PKR~79.3trn, showing growth of ~0.29%, a notable slowdown compared to the previous year (SPLY:~6%). Industrial activities accounted for ~21.7% share of the GDP. The slow economic growth came about due to factors like political unrest, hyper inflation and flash floods of Aug'22. Moreover, imposition of import restrictions resulted in slowdown in business activity across various industries, which was reflected in Large scale manufacturing (LSM) growth declining by ~10.3%. This, in turn, dampened the demand for Industrial Gases which can be observed from their margins. In FY23, the Sector's average gross margin reduced to ~19% (SPLY: ~23%), average operating margins were recorded at ~13% (SPLY: ~16%), while average net margins also declined sharply to ~4% (FY22: ~10%).
- Concomitantly, production in FY23 witnessed a decline of ~1% YoY, despite demand of oxygen in health Sector. This likely resulted from a slowdown in economy's industrial segment. Despite this, the Sector's revenue recorded at PKR~18bln in FY23, a growth of ~11% YoY basis.
- Production capacity of the major players is being enhanced by setting up new plants which has resulted in an increase in the borrowing of the Sector by ~7% in FY23 to finance the new projects. This is likely to increase leverage of the Sector, which recorded at ~60% in FY23 (SPLY: ~42%). Moreover, the LSM output has increased ~8.4% MoM and ~0.5% YoY basis during 2MFY24, exhibiting signs of early recovery in the economy. This is likely to spur demand for Industrial Gases further.
- In the long run, overall profitability of the Sector is expected to strengthen if the economic situation remains on course. Industries like research and technology are growing rapidly which increase the use of gases like argon and other rare gases (neon, krypton and xenon). Gases such as nitrogen and carbon dioxide are used in packaged food to seal freshness by removing oxygen and moisture. With the rise in the consumption of packaged and tinned food, the demand for nitrogen and carbon dioxide is likely to increase.
- Overall, the Sector's performance during FY23 remained stable. Meanwhile, one of the major Sector players is actively planning for expansion despite facing challenges like rising costs and economic slowdown. However, the success of these expansion plans may depend on factors like future energy costs, demand for Industrial Gases, and effective financial management.

# Industrial Gases

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- NEPRA
- FBR

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