

## Industrial Gases

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Industrial gases refer to a group of gases which are considered as an essential input in various industrial processes. Major industrial gases include hydrogen, oxygen, helium, nitrogen, carbon dioxide, argon and acetylene. These gases are used either for their physical or chemical properties such as coldness, inertness, and reactivity. Since properties of different industrial gases vary, there is a wide array of applications and end users for this industry.

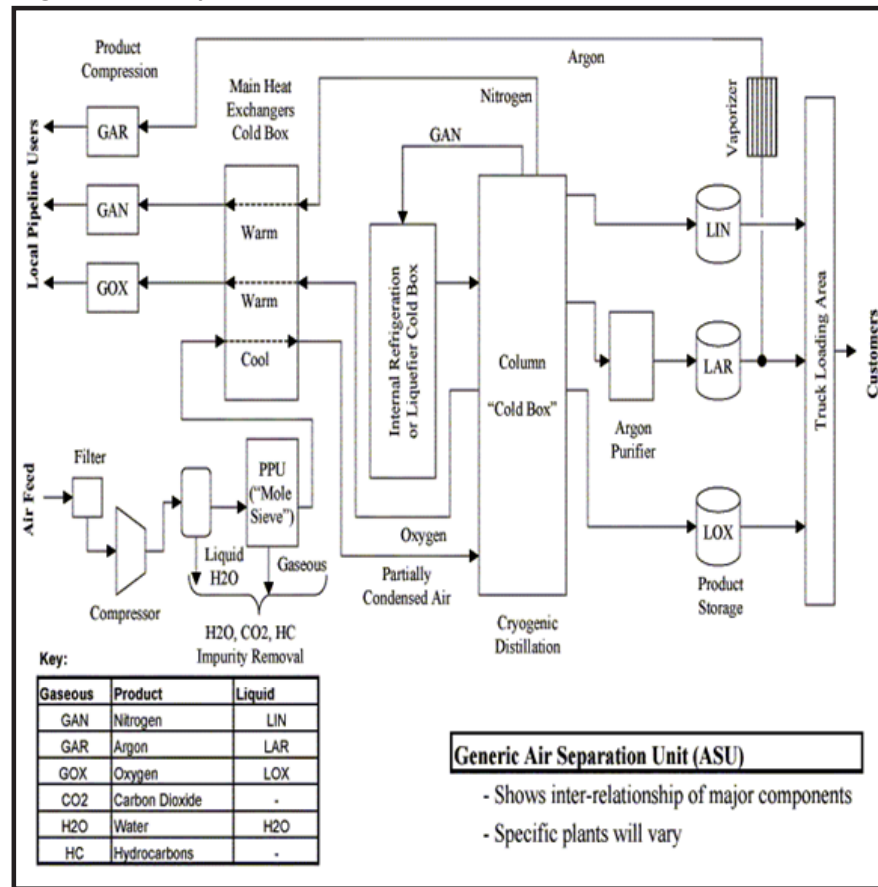
*As per industry estimates, demand for ASU gases is expected to grow at a CAGR of 5%-6%. Assuming ceteris paribus, national demand may surpass the existing installed capacity within the coming 4-5 years.*

<b>Major Industrial Gases</b>	<b>Primary uses</b>
Acetylene	Used in oxyacetylene flames for cutting mild steel and for welding
Carbon dioxide	Used as protective blanket to prevent substances from oxidizing
Hydrogen	Used for cooling in the food and manufacturing industries and also for carbonating beer and soft drinks.
Helium	Used in refineries to remove sulfur and also utilized to hydrogenate unstable, unsaturated hydrocarbons and fatty acids in animal and vegetable oils.
Oxygen	Used as a protective gas for growing silicon and germanium crystals, in titanium and zirconium production, and in gas chromatography.
Nitrogen	Used with fuel gases in gas welding, oxygen scarfing, flame cleaning, flame hardening, and flame straightening. It is also used as a raw material in oxidation processes in various industries.

Air is largely composed of nitrogen (78%), followed by oxygen (21%) and traces of noble gases and other compounds. Argon, nitrogen and oxygen are produced through purification and fractional distillation of air conducted in Air Separation Units (ASUs). The gases are separated based on their differences in boiling points.

The following figure depicts the separation process at a generic air separation unit:

Figure 2: Air Separation Unit<sup>1</sup>



Hydrogen production processes can be broadly classified into two categories, namely conventional hydrogen and renewable hydrogen production. As per the conventional way, hydrogen is produced from fossil feedstock through steam reformation of natural gas. Moreover, renewable hydrogen production is based on renewable feedstock which includes biogenous process (biomass gasification or biogas reforming) or electrolysis of water<sup>2</sup>.

In 2014, global industrial gases market was valued at approximately USD 45.0b and is expected to grow at a CAGR of 6.0% during the period extending from 2015 to 2020<sup>3</sup>. The market is dominated by few major players, namely L'Air Liquide S.A, Air Products and Chemicals Inc., Linde Group AG, Germany (Linde AG), Praxair Inc., Taiyo Nippon Sanso Corp., Airgas Inc., Matheson tri-Gas Inc. and Air Gas Inc. These market players accounted for approximately 80% of the market share in 2015<sup>4</sup>. Since multiple industries are dependent upon usage of industrial gases, customer-wise revenue concentration of key global players is lower. Furthermore, the global industry is characterized by low operating margins on account of sizeable operating costs. This has forced companies to resort to volumetrically expansion in order to increase market share. Consequently, a recent trend of consolidation has been witnessed across the industry, as signified by Air Liquide's acquisition of Airgas.

Demand for industrial gases varies on a region and industry wide basis. In 2015, North America, Europe and Asia remained the leading regions in terms of sales, while the highest growth was observed in the Asian region vis-à-vis the preceding year. Since the gases are utilized as a raw material

<sup>1</sup> <http://www.uigi.com/cryodist.html>

<sup>2</sup> [http://www.linde-gas.com/en/innovations/hydrogen\\_energy\\_h2/h2\\_one\\_stop\\_shop/h2\\_production/index.html](http://www.linde-gas.com/en/innovations/hydrogen_energy_h2/h2_one_stop_shop/h2_production/index.html)

<sup>3</sup> <http://www.marketresearchstore.com/news/global-industrial-gases-market-172>

<sup>4</sup> <http://www.businesswire.com/news/home/2016085033/en/Technavio-Announces-Top-Vendors-Global-Industrial-Gases>

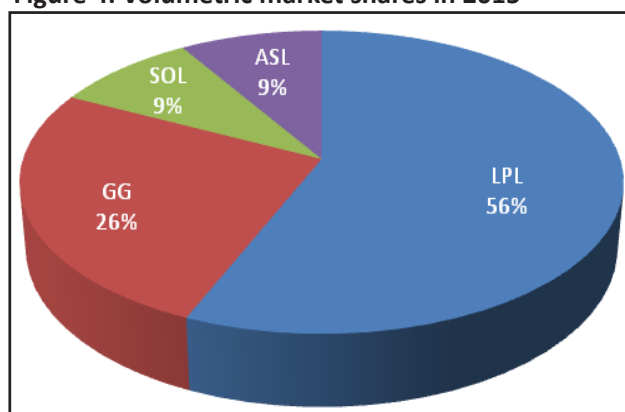
for various manufacturing processes, industrial production remains a key growth driver for the gases industry. On the other hand, major challenges for the industry include high cost of production and compliance with the stricter regulatory regimes and safety concerns across the world.

ASU gases market in Pakistan can be divided into two basic regions: north-west and south region. Major players in the north-west region include Linde Pakistan Limited (LPL), Ghani Gases (GG) and Sharif Oxygen (Pvt.) Limited (SOL) while the southern region is dominated by LPL, GG and Agha Steel Ltd (ASL). Moreover, the industry is also characterized by presence of sizeable informal sector which caters to the local demand. Excluding the informal sector, total market size of north-west region is around 218 tonnes per day (TPD) while that of the south region is approximately 167 TPD. The following table depicts the key details about major market players across the country:

<b>Figure 3: Major players in ASU market (2015)</b>	<b>Operational capacity</b>	<b>Capacity utilization (%)</b>
Linde Pakistan Limited	221	98
Ghani Gases	168	60
Sharif Oxygen Limited	53	64
Agha Steel	34	100
<b>Total</b>	<b>475</b>	<b>81</b>

Greater operational capacity and high service quality has enabled LPL to sustain the largest market share in the industry. However as per management, the company may not be able to cater to any additional uptick in demand unless it increases its operational capacity through additional investment. Both players are considering installation of new plants in order to increase their capacities. As a result, leverage indicators of LPL and GG are also on the higher side.

**Figure 4: Volumetric market shares in 2015**



During 2015, market prices followed downward trajectory on account of excess supply in the market along with increased competition in the gases industry. During the year, producers passed the benefit of reduction in input costs to the consumers in a bid to maintain their relative market shares

Figure 5: Key Figures of Listed Players (PKR million)	CG		LPL	
	FY15	FY14	FY15	FY14
Net Sales	1,720.1	1,347.4	3,914.2	3,925.0
Gross Margin	33.1%	24.3%	21.2%	18.1%
Net Margin	9.2%	5.4%	3.6%	3.2%
Total Debt	1,202.8	942.4	1,310	1,338
FFO/debt	21.6%	11.7%	29.0%	19.1%
Debt Leverage	2.27	2.14	1.71	1.72
Gearing	1.08	0.94	0.76	0.79

Despite stiff competition and lower prices, these companies were able to improve their gross margins in 2015. This was a result of significant volumetric growth that these players exhibited during the outgoing year. Key players, such as LPL and CG, depicted better margins on the back of improved production efficiencies. Moreover, CG was able to overcome its electricity shortage problems during the year. Given LPL's higher expense base, the company reported a lower net profit in comparison to its major direct competitor.

Logistics and distribution sector is the largest consumer of ASU gases, followed by healthcare sector. Chemical sector and ship-breaking industry also account for sizeable proportion of overall consumption. The following depicts the overall utilization by different industries in Pakistan:

Figure 6: Sector wise Consumption	2015
Logistics & Distribution	26%
Healthcare	25%
Chemicals	11%
Ship breaking	11%
Steel & Rolling Mills	8%
Manufacturing	4%
Food & Beverage	3%
Glass	3%
Oil & Gas	3%
Others	6%

As per industry estimates, demand for ASU gases is expected to grow at a CAGR of 5%-6%. Assuming ceteris paribus, national demand may surpass the existing installed capacity within the coming 4-5 years.

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