



Electronics Materials Information



TEHCET Critical Materials: Electronic Gases QUARTERLY UPDATE


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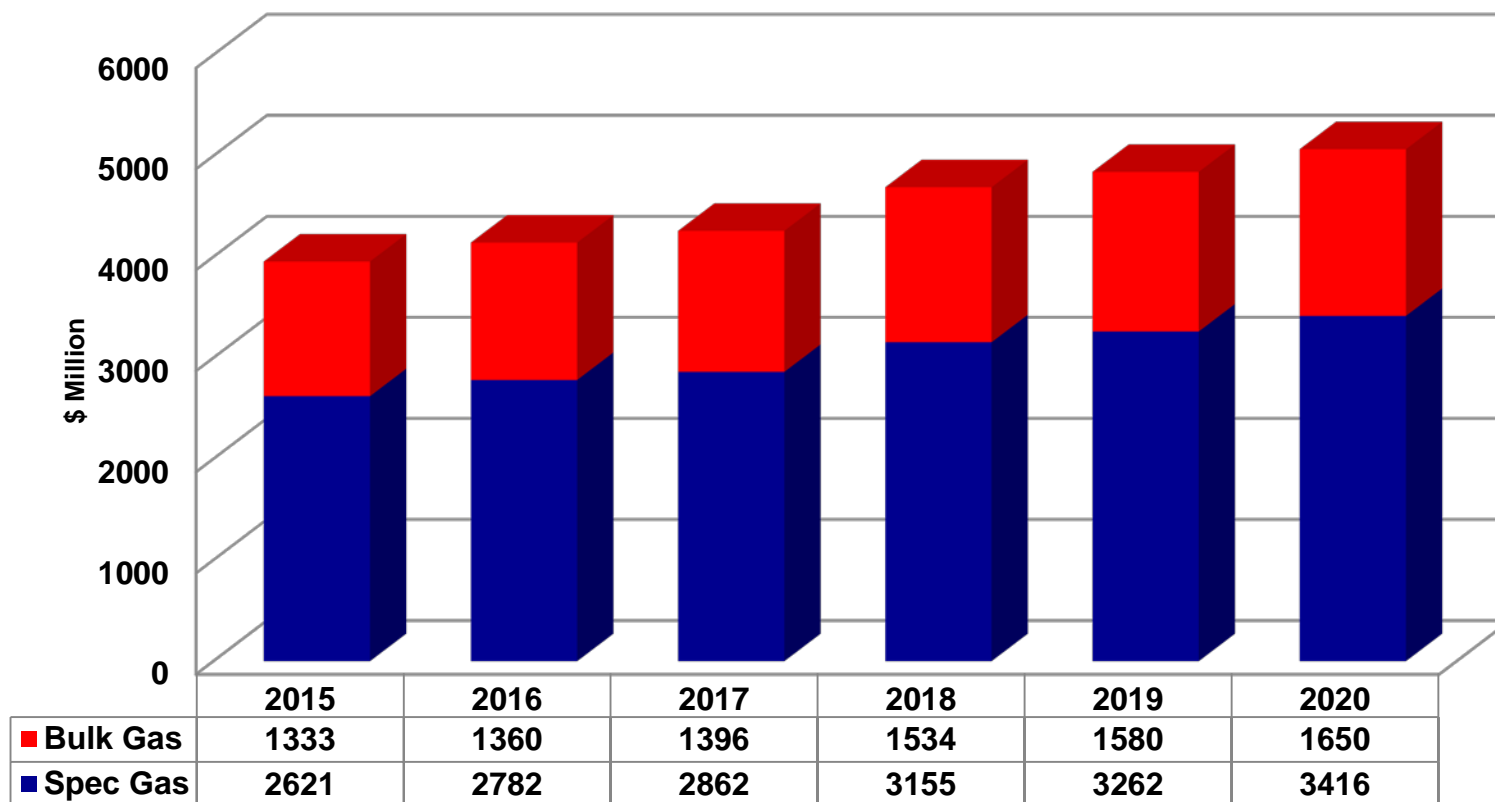
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Electronic Gas Forecast






Electronic Gas TAM Forecast



Gas Incidents

-  July 6 – A Praxair liquified tanker truck caught on fire on I-65 in Mobile County, Alabama. The fire was in the engine block of the rig and no gas release was announced.
-  September 13 – A roof over the generator building caught fire at the Praxair Burns Harbor facility in Indiana. The fire spread over a 820 x 30 foot area and required fire department dispatch. No injuries were sustained and no gas leaks occurred.




Qatar Update - 1

-  The two RasGas plants that were shutdown on June 12th have restarted, effective July 2nd.
-  Qatar has begun using it's own port in Hamad to transport helium worldwide.
-  They have developed new shipping routes, minimizing the impact of the blockade
-  Although the blockade has shrunk Qatar imports by 40% YoY, Helium effects were short term and shipments are resuming
-  Helium markets will return to a relative normal by October





Qatar Update - 2

-  Update from the Qatar Government Communications Office on September 24, 2017:
 -  The siege imposed by some countries on Qatar will have no impact on its overall global trade.
 -  Trade between Qatar and blockade countries only amounts to 6.7% of total global trade
 -  Qatar has not delayed or missed a single shipment since the blockade began
 -  Major trade partners, Japan, South Korea, and India account for \$60B in global trade revenue and this will continue
 -  Qatar has accelerated its plan for economic self sufficiency

Qatar Update - 3

-  New shipping routes established by Qatar is causing some logistical issues:
-  Industry container fleet is stretched tight as more containers are required for the longer shipping routes and times
-  Helium prices may see increases in the near future as gas suppliers need to purchase more containers for their fleet management and shipping costs of private charters being used by Air Liquide and Linde will further add to costs.

Mergers and Acquisitions - 1

-  Air Products and Linde North America announced the formation of a new joint venture named East Coast Nitrogen
-  The JV will build a new 1,100 TPD ASU and liquifier in Glenmont, NY and produce LIN, LOX, and LAR
-  Product will be distributed by both parents to the New York and New England markets.
-  Approximate investment is \$60MM and targeted completion is December 2018

Mergers and Acquisitions - 2

- Showa Denko has established a wholly owned subsidiary named Showa Chemicals of America, Inc. (SCA) in Austin, TX. The operation will start in October with the following goals:
 - Further expand its high purity gas business in the US
 - Strengthen relationships between SDK and major semiconductor manufacturers in the US
 - Gather information about state-of-the-art semiconductor processing technologies
- This represents a direct threat to US based gas suppliers as Showa Denko looks to expand its influence (and sales) from Japan and Asia to the US market. TECHCET has been forewarning about Showa Denko's expansion strategies for the past couple of years. This is a major step.

Mergers and Acquisitions - 3

- Gelest was acquired by New Mountain Capital, a New York based private equity firm.
- New Mountain gains controlling interest in Gelest
- Monetary terms were not disclosed
- Current Gelest Management will remain in place
- New Mountain will pursue expansion strategy and look for potential mergers for Gelest in the next 2-3 years
- Gelest produces Electronic grade Germane gas

Dow Dupont Merger Update

-  DuPont and Dow Chemical confirmed on June 15 that an agreement with the US Department of Justice had been reached, clearing the regulatory approval needed in the US.
-  Dupont will divest certain parts of its crop protection portfolio
-  Dow will divest its global ethylene acrylic acid co-polymers and ionomers business
-  DowDupont received all regulatory approvals as of August and will start trading on September 1st under the ticker “DWDP”
-  Now starts the 18 month journey to dismantle the newly merged company into three entities

Linde and Praxair Merger Update

- 🌐 August 15 marked the start of the 10 week acceptance period for the merger. During this time, which runs through October 24, 2017, both parties will need to gain approval of their shareholders:
- 🌐 Linde will need 75% of its shareholders to tender their stock to the new company
- 🌐 Praxair will only require a majority vote at the shareholder meeting at the end of September
- 🌐 Expected closing is 2nd Half of 2018




WF6 Market Tight

- 🌐 Although no current shortage exists, the market has been tightening up due to increased demand of WF6 for 3D NAND technologies where multiple depositions are required for each layer
- 🌐 Versum Materials will complete a debottlenecking project in the 3rd quarter this year and a further expansion is slated for the 2nd Half of 2018 and possibly in 2019
- 🌐 Other WF6 suppliers are currently assessing the market and will most likely expand production capacity in the next one to two years in South Korea and Japan

Showa Denko Price Increases

- 🌐 Showa Denko announced price increases for its high purity fluorine-based gases for Electronics
- 🌐 FC-116 (C_2F_6) and FC-14 (CF_4) will increase by Yen 500 per Kg (~\$4.5/kg) for shipments effective September 1, 2017
- 🌐 Raw material and energy price increases were the main reasons cited.
- 🌐 You may not obtain these products directly from Showa Denko but your supplier may resell their products to you. Ask your supplier.

SDS and UpTime Competition

-  Versum Materials and NuMat Technologies announce a global commercial agreement to offer a new line of products for the safe storage and delivery of dopant gases
-  Product line is called ION-X and is based on a revolutionary Metal Organic Framework (MOF's) which can selectively adsorb, store and deliver ultrahigh purity gases at sub-atmospheric pressures
-  Will provide competition to both Entegris SDS and Praxair UpTime as well as hydride cylinder business

Thank You!
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