

Linde leads in rare gas supply chain for electronics with investments, business continuity planning and advanced capabilities

- *Xenon expansion project at Alpha, New Jersey plant to be completed this quarter*
- *Business continuity planning expansion at Medford, Oregon plant*

Bridgewater, N.J., and San Francisco, CA., U.S., July 6, 2017 – Gases and engineering company The Linde Group, the leading supplier of rare gases, is investing in its own production and increasing and diversifying its portfolio of third-party sources to meet the growing demand for rare gases in electronics. Leveraging its cryogenic engineering expertise and industrial gas footprint, Linde has over 35 captive air separation units (ASUs) with rare gas production.

Linde rare gas supply chain capabilities

At Linde, technology enables capability. Beginning with cryogenic engineering know-how and equipment fabrications, Linde excels at all steps in the supply chain of rare gases. Owning the entire supply chain ensures that customers receive the highest product quality and reliability. Linde rare gas capabilities include the following:

- Design and manufacture of ASU and rare gas extraction equipment
- Largest, most diverse and expanding collection of rare gas sources
- High-volume dynamic mixing and blending capabilities for key lithography products
- Purification capabilities for neon, krypton and xenon
- New product innovation for emerging electronics rare gas applications

“A year ago we announced that we were increasing neon capacity by 40 million liters at a newly installed neon production facility in La Porte, Texas,” said Matt Adams, Head of Sales and Marketing, Electronic Gases & Specialty Products. “We are currently adding rare gas processing capacity at our Medford, Oregon plant as part of our business continuity planning.”

Neon

Linde recognizes the increasing neon demand from DUV (deep UV) multi-patterning lithography and other excimer laser applications. Linde has strengthened its supply chain in Europe, added purification capacity and manages a portfolio of its own and third-party sources.

Xenon

To meet the high-volume commercial adoption of xenon for etch applications in new 3D semiconductor structures, Linde is completing a xenon expansion project later this quarter at its Alpha, New Jersey plant. With xenon sources on three continents, Linde is enlarging its supply and making it more robust.

Laser gas mixtures

Linde continues to lead in the supply of DUV laser gases to the semiconductor industry. All of the major lithography equipment manufacturers and the world's largest chip manufacturers benefit from the development of new technologies and innovations driven by our Centers of Excellence such as the one for laser gases in Alpha, New Jersey.

- Production of all laser gases, including fluorine
- Optimized and expandable separation and purification capacity
- Precise and accurate mixing capability and analytical technology
- Cylinder packaging expertise: proprietary technology for the treatment of cylinders containing mixtures of rare gases and fluorine

“We continue to invest globally in our own sources, and at the same time develop additional supply capacity with our partners,” said Andreas Weisheit, Head of Linde Electronics. “Our industry-leading combination of source portfolio and vertical supply chain capability makes Linde a unique provider to the electronics industry.”

Linde Electronics will be exhibiting at SEMICON West tradeshow in San Francisco July 11-13. Its focus will be on the quality, expertise, commitment and environmental leadership that Linde Electronics brings to

the semiconductor industry through such offerings as electronic specialty gases, on-site solutions, materials recycling and recovery and SPECTRA® nitrogen plants.

SEMICON West is the annual tradeshow for the micro-electronics manufacturing industry. All visitors are welcome to visit Linde in booth number 5952 in the North hall in the Moscone Center in San Francisco. For further inquiries, please contact Francesca Brava at francesca.brava@linde.com.

About The Linde Group

In the 2016 financial year, The Linde Group generated revenue of EUR 16.948 bn, making it one of the leading gases and engineering companies in the world, with approximately 60,000 employees working in more than 100 countries worldwide. The strategy of The Linde Group is geared towards long-term profitable growth and focuses on the expansion of its international business, with forward-looking products and services. Linde acts responsibly towards its shareholders, business partners, employees, society and the environment in every one of its business areas, regions and locations across the globe. The company is committed to technologies and products that unite the goals of customer value and sustainable development.

For more information, see The Linde Group online at www.linde.com

About Linde Electronics

Linde Electronics is an industry leader in gases for the electronics market—semiconductor, solar, display and LED. Linde Electronics helps electronics companies achieve their goals through a strong focus on quality and environmental leadership, its expertise, commitment to the industry through ongoing investments in processes, engineering, and on-site and localized solutions, a broad portfolio that includes environmentally sustainable and highly specialized and rigorously measured electronic specialty gases (ESGs), bulk/pipeline gases, equipment, and services, and through working closely with customers to better meet their evolving needs.

For more information, visit www.linde.com/electronics or contact electronicsinfo@linde.com.